Agricultural Outlook Forum'97

Proceedings

Presented by the U.S. Department of Agriculture

February 24 & 25, 1997

Washington, D.C.

PREFACE

Agricultural Outlook Forum '97, the seventy-third outlook meeting sponsored by the U.S. Department of Agriculture, was held on February 24 and 25, 1997, at the Omni Shoreham Hotel in Washington D.C. More than 800 people representing all facets of the agricultural community took part in the Forum.

With a theme of "Charting a New Course," the program of the Forum was designed to illuminate long-term prospects in light of the landmark farm legislation enacted in 1996, agriculture's evolving market structure, and a more open international trade environment. On the opening afternoon, distinguished speakers discussed the outlook for agriculture in 1997 and beyond, changes ahead for farmers, risk management for agriculture, and world food security.

The second day of the Forum opened with presentation of USDA's long-term agricultural projections to 2005. Throughout the day, Government analysts, industry experts, and farmers discussed 1997 farm and food prospects, the impact of new agricultural technology, and changes in markets and information needs. The meeting concluded with two sessions on the challenges of expanding exports of high-valued farm and food products.

Additional copies of these proceedings are available from ERS-NASS, 341 Victory Drive, Herndon, VA 22070; phone 1-800-999-6779. The speeches presented here are also available on the Internet at the following address: http://www.usda.gov/oce/waob/agforum.htm.

Two reports on the new long-term projections presented at the Forum are available: *Long-term Baseline Projections to 2005, Reflecting the 1996 Farm Act*, WAOB-97-1; and *International Agricultural Baseline Projections to 2005*, AER-750. Copies can be ordered from ERS-NASS at the address noted above.

For more information about this volume or the Outlook Forum, call 202-720-5447 or contact rbridge@oce.usda.gov.

Gerald A. Bange

GERALD A. BANGE
Chairperson
Outlook Forum Steering Committee

Washington, D.C. April 1997

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REMARKS OF SECRETARY DAN GLICKMAN AT THE 1997 AGRICULTURAL OUTLOOK FORUM

INTRODUCTION

Thank you and welcome to the 1997 World Agricultural Outlook Forum.

There's an old Turkish proverb that says, "he who speaks the truth better have one foot in the stirrup." I just want to say that I'm quite comfortable up here with both feet on the ground.

USDA's been holding this forum for almost 75 years now. I doubt any Secretary of Agriculture's ever forecast the end of the world. But I do know there's never been a Secretary who could say -- with the same certainty I do today -- that the outlook for American agriculture is very, very good.

I've been talking to economists ... to Members of Congress ... to our customers both here and overseas ... and to farmers in the field. Each, in their own way, has told me the same thing:

* The economists give a cautious, but enthusiastic thumbs up.

* A Republican-led Congress and a Democratic Administration continue to rally -- in a bipartisan way -- around the positive changes taking place in agriculture.

* The American people express a level of confidence in the safety and quality of their food that's rare overseas. World demand for U.S. food and fiber has never been higher.

* Veteran farmers -- the most cautious business people in America -- are buying more equipment, and making the kinds of investments that shows confidence. And more and more young rural men and women are passing up the city to stay on the family land or start a farm of their own.

There's a bright future ahead for agriculture.

We live in optimistic times. Just look at the stock market -- 4,000 ... 5,000 ... 6,000 ... 7,000 -- all in the span of a few years. Agriculture's echoing this rally by breaking records of our own -- from exports, to farm incomes, to sheer volume produced.

President Clinton calls this "the age of possibility." I'm inclined to agree.

We've all got the flush of a year of record-high prices ... the second highest farm-income levels ever, right behind 1994 ... We would have broken that record too if grain prices hadn't squeezed

cattle so hard ... $5 corn and $7 wheat ... Cash receipts are at an all-time high -- topping $200 billion ... The value of farmland has gone up 6 or 7% ... Ag exports reached close to $60 billion ... We're starting 1997 on solid ground.

With the year 2000 just around the corner, everyone's talking as if -- when those 3 zeroes click over -- a magical new world will appear. But we in agriculture have already made the leap.

For most Americans, agriculture is a constant in life. Food is safe, abundant and affordable ... almost like on the Star Trek Enterprise where a computer gives crew members whatever they want to eat, whenever they want it. But if you look closely at agriculture, you see that it's not standing still. It's evolving and adapting so quickly that most of us don't even notice.

Just consider how far we've come. America started out as a country of subsistence farmers.

Today, less than 2% of us farm. Fortunately, technology and farm ingenuity have sparked a perpetual revolution in productivity. That's something 98% of Americans have the high luxury of taking for granted.

Farmers worry enough for all of us. They face every day knowing that a drought might suck their fields bone dry or a flood could replant their crop 2 counties over.

It reminds me of the joke about the stranger who stops to talk to a farmer who's out on his porch:

"How's your wheat coming?" he asks.
"Didn't plant none," the farmer replies.
"Really? I thought this was good wheat country."
"Afraid it wouldn't rain."
"Well, how's your corn crop?"
"Don't have one."
"Didn't plant any corn either?"
"Afraid of corn blight."
"Well, what did you plant."
" Nothing," says the farmer.
"I decided to play it safe."

Farming is uncertainty and risk. As we enter a new era in agriculture, there's even more risk, but there's also tremendous opportunity. The signature shift is government easing out of the marketplace. Our not-so-invisible hand is coming off the scales, and we're recognizing that when it comes to the forces of supply and demand ... perhaps the best role for government is to simply get out of the way.

Farmers are taking the lead in the day-to-day business of agriculture. They're fast becoming market-savvy entrepreneurs. With agriculture going high-tech -- changing everything from the way we water our crops to how we inspect our meat ... with food and fiber playing such a central

role in the global marketplace ... this is a natural division of labor. As one Iowa corn farmer put it, "It's farming how our grandparents knew we should."

And it frees USDA to govern as we should -- by focusing more on the big questions of agriculture's future: How do we feed a growing world without destroying the land base? How do we help all farmers -- big and small, in every field -- better manage risk? How can we expand global opportunities?

It's a different, less interventionist role for government, but it's also a more important one.

ENVIRONMENTAL CHALLENGE

Can we feed a growing world without destroying the environment? The honest answer is maybe. It depends a lot on the choices we make today.

There's a consumer choice: Will the world accept biotechnology? It's in some ways an odd question since in many cases, the world already has: I don't think there's a diabetic out there who'd object to insulin. Biotechnology goes all the way back to the 1800s with Gregor Mendel cross-pollinating his pea garden. Then, he was an eccentric green thumb. Today, he's the father of genetics.

It's an important question -- will people accept biotechnology? It's our best shot at feeding a hungry world and leaving a sustainable environment. It gives us cost-effective ways to produce crops with more nutrition, that require less water, that can endure harsh weather, that can fend off pests without using pesticides. Where it is safe, and it has proven safe, we shouldn't turn our backs on it.

That's not to say that people shouldn't make their own choices. Throughout history, people have been suspicious of technological progress ... sometimes rightly so. But I think we can do a better job of demystifying biotechnology, and making sure folks know that we are keeping a vigilant eye on these products. If we say they're safe, it's because our scientists have proven they're safe.

Another choice will be how we use our natural resources. The dustbowl days of the dirty 30s served as a somber warning that we can push Mother Nature beyond her limits -- bankrupting our farmers and leaving a barren earth. We have to protect the land that feeds us. Our #1 tool to do that is the new Conservation Reserve Program. It's our farm bill for the future. Where the old CRP allowed government to manipulate supply and demand, the new one is a true conservation program.

It will prevent soil erosion, protect wildlife habitat and improve our air and water quality. It won't take healthy land out of production. It's bound to a strong set of environmental criteria which USDA staff will use -- out in the field -- to rank bids against one another. Only the most environmentally sensitive land will be accepted.

I know there's concern about the amount of acreage eligible for the CRP. I'd just say: There's a lot of students eligible for Harvard, too. By law, we can enroll less than 15% of eligible land.

We'll take what gives us the biggest environmental bang for the taxpayer buck, and leave supply and demand to the markets.

RISK CHALLENGE

Farmers are happy to see government get out of the markets. But they're also wary of the risks. I'm sure our Wall Street contingent today could empathize.

Especially now at the outset, there's going to be pressure on government to step back into markets. For example, because of recent wide price swings in dairy, some in the industry wanted me to change the floor prices. Most didn't, and I didn't. We took other steps instead. We accelerated purchases for domestic feeding programs, like we earlier did with beef. We stimulated exports and asked questions about the National Cheese Exchange. Where are we today? Dairy prices are up. Milk prices are up. They still have a ways to go, but the worst is hopefully behind us.

As a general rule, government should not micromanage markets, but we should spread a safety net. Our farmers perform the most essential work around. Protecting them from risk is in the national interest. That's why this Administration promised farmers a safety net for the future. We deliver in our 98 budget:

* We make revenue insurance available nationwide, so farmers can buy protection from weak markets as well as powerful storms.

* We reform farm credit by ending the one-strike-you're-out policy which disenfranchised a whole class of good farmers who went under in the 80s.

* And we allow commodity loan extensions and managed haying and grazing on conservation reserve land when markets get tough.

None of these are budget busters, but they get the job done.

Another simple way government can help is as an information broker. This is, after all, the Information Age. Knowledge is power, and farmers are hungry for it. They have to be shrewd in business, like never before.

50 years ago, farmers were fairly autonomous. They used their own labor, made their own fertilizer, ate their own crops. What they sold, they sold largely on the cash market. Today, like everyone else, they have consultants ... people tell them when to apply pesticide ... people scout their fields for insects ... farm managers ... marketing analysts ... bankers.

Farms with a production or marketing contract make up 40% of what's produced in this country.

These contracts can help reduce risk, but there's a lot of them out there. Farmers need straightforward information. Otherwise, we get situations like the hedge-to-arrive fiasco where many producers felt they didn't understand what they'd gotten into. Who could tell? Many of these contracts weren't even on paper.

Information is also a great equalizer. As I travel around the countryside, the issue I hear most about is livestock concentration. Sunlight's been our solution. We dramatically expanded market reporting data to help smaller producers get a fair shake.

We're also helping family farmers by proposing estate tax relief, so the farm can pass from generation to generation as an opportunity instead of a financial headache.

These are modest but meaningful reforms. But they're not all we're doing. This Administration's most far-reaching risk management effort stretches all the way around the world. After all, what better way to reduce the risks of the marketplace than expanding the size of the marketplace?

TRADE CHALLENGE

This Administration has opened up more doors around the world than any in history. That's why, last year, we hit nearly $60 billion in ag exports. You may read about airplanes and computers, but the fact is, when people around the world buy American, more than anything else, they buy American agriculture. We are once again #1, and we plan on staying that way.

Our export sales will slip a bit this year -- to about $56.5 billion. That's up $1 billion from our December projections, mainly because of recent heavy shipments of oilseeds and cotton to China, the EU and Mexico. It's still $3.5 billion below last years record levels, but that's more the result of grain prices coming back down to earth than anything else. Our sheer volume of exports is still strong. Bulk commodities will be a crowded field. Those numbers will slip slightly. But exports of our high-value products will continue their record climb, and that's a strong signal of what lies ahead.

There's a world of opportunity out there. Some days I feel like I should be the Ambassador of Agriculture. I've been to China ... to the Phillipines for the Asia-Pacific economic summit ... to Europe several times. In the coming months, I'll go to Latin America and back to the Pacific Rim. I've just returned from South Africa with Vice President Gore.

That was an amazing visit. It's good to see freer markets and freer people making progress together. Our relationship with South Africa is one of 4 that Vice President Gore has set up with emerging democracies -- along with Russia, the Ukraine and Egypt.

Egypt's a very promising market. It's our biggest in the Middle East. From 1994 to 1996, they've gone from buying $613 million to $1.5 billion in U.S.

agricultural goods -- mostly grains -- much of that feed grains for their poultry industry. As a result, their poultry business is booming, incomes are on the way up, and we've got better customers.

These commissions cut through reams of red tape. I was in a meeting between Vice President Gore and Victor Chernomyrdin that was breakthrough after breakthrough after breakthrough. I like Chernomyrdin. He's from the Ukraine like my family. In fact, he looks a lot like my grandfather. I found that charming ... until others noted how much he looked like me.

We had similar success in South Africa, and it worked both ways. Their national flower is the protea. It's huge. It's beautiful, and it looks like it could eat you. We recently allowed their import into the U.S. The South Africans very much want to see our doors stay open.

Subtlety isn't too big over there. We got off the plane. We were greeted with protea. We went for a tour of the countryside. They pointed out the wild protea. We visited a farm ... that grew protea.

The centerpiece at our reception ... the vases in our hotel rooms ... the decorations at the press room ... you get the picture.

At least they were beautiful. I, on the other hand, talked about karnal bunt every time they gave me a flower. But it paid off. I returned home with an agreement that South Africa will buy $34 million in wheat from the quarantine areas that has twice tested negative. This is a major break in the logjam of our perfectly saleable wheat. More will follow.

Of course, not all of our trade negotiations are an exercise in diplomatic decorum.

Our relationship with the European Union is particularly tenuous. We had diametrically opposite reactions to last year's tight grain markets. They clamped down with export controls. We said, "no embargo." Later, when stocks eased, they went forward with export subsidies. We held our fire. We still are, but we can't hold out unilaterally forever.

In our 98 budget, I've asked for full funding of our Export Enhancement Program -- an increase of $400 million. That's my big stick, and I'm prepared to use it if that's necessary to protect our producers from unfair competition.

This Administration won't hesitate to go to the mat for the rights of our producers. It's important for team USA, but it's equally important to the integrity of the World Trade Organization. It's still young and impressionable. We need to shape it around the principles of fairness.

The big test ahead is the EU ban on U.S. beef cattle raised using hormones. Study after scientific study has shown this beef to be perfectly safe. Under the Uruguay Round, that means our producers have a right to compete in European markets. We've been denied access for 8 years.

So we've taken the EU to the WTO on this, and I expect a decision in the coming months. We have a solid case, and we're optimistic that those markets will soon be fair game.

Phony science trade barriers are one of the biggest threats to fair trade. As traditional barriers fall away, every government -- including our own -- is facing pressure to be creative. We can't give in. As one cattleman colorfully put it, " mixing trade with politics is the easiest way to get your butt kicked."

Sound science must be our referee. That's why we lifted the ban on Mexican avocados. Our scientists had concerns about the spread of pests. We worked through them and developed a satisfactory system. Now that we've shown our commitment to resolving disputes with science, we're seeing it reciprocated. Just last week, Mexico accepted our sweet cherries into their markets. That's a $7 million decision for our producers. Fairness won't guarantee that we win every argument. But it ensures a level playing field, and that's all America needs to succeed.

It reminds me of the old joke about the chickens out scratching in the yard. A football that's accidentally kicked over the fence plunks down ... the rooster struts over, inspects it, turns to the hens, and says, "I don't mean to criticize, but look what they're puttin' out next door!"

America's got the football, and we're running with it. We're setting the world standard -- on principle, on productivity, on quality, on safety. We're the most competitive nation in the world. So we should see the world for what it is -- 96% of our potential customer base.

That means pushing forward on freer trade -- extending NAFTA into South America, expanding the WTO and pressing for further reductions in trade barriers in the 1999 GATT negotiations. The major farm groups have largely rallied behind expanding freer trade. They should be commended for doing so. It's forward thinking, but it doesn't win popularity contests. This, for me, is one of the fundamental mysteries of our time.

You won't find a stronger case out there for freer markets than U.S. agriculture. Expanding trade has driven our record growth, and it's the only way we can sustain it. Domestic demand is relatively flat. It's world demand that's going through the roof -- especially in Asia and Latin America where populations and incomes are skyrocketing. Open doors are wide open opportunities ... as long as agriculture stays in the mix of trade negotiations.

In a few minutes, you'll hear from a friend. The Japanese call her the "dragon lady of America." In my book, that's the best introduction a U.S. Trade Representative could ask for. Charlene Barshefsky will fight for American agriculture.

And we need a fighter ... particularly on China. I know she's going to talk about that. I'll just say that the latest signals on the agricultural front are not good. For the past 2 years, the Chinese government's been fixated on self sufficiency and has intensified its role in basic ag commodity markets. This certainly doesn't help their case for joining the WTO.

Part of the whole point of freer markets is the guarantee that countries who can't grow enough food can buy enough food. That's why the United States was so adamant against a grain embargo. We're serious about being that reliable supplier. If China's successful in boosting its grain production, there might be a dampening of world demand in the short run. But it's hard to believe -- given their population demands -- that we won't soon see a return to imports.

CONCLUSION

So for a government that's getting out of the day-to-day business of agriculture, I'm certainly finding myself very busy these days.

A wise man once said there are 3 basic questions in life. Where have we been? Where are we now? And how the heck did we get here? He sounds like a farmer. We don't have a whole lot of faith in crystal balls, but it's hard not to have faith in all the positive changes taking place.

Gandhi once said, "The difference between what we do and what we are capable of doing would suffice to solve most of the world's problems." I think we, in agriculture, are just beginning to comprehend all that we are capable of achieving.

If we face the challenges and the risks ahead together, then agriculture's future will surely surpass even its own stunning history.

Thank you.

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REMARKS PREPARED FOR DELIVERY BY AMBASSADOR CHARLENE BARSHEFSKY
Office of the U.S. Trade Represenative

INTRODUCTION

I would like to begin by thanking Agriculture Secretary Dan Glickman for the invitation to speak to you today and Deputy Secretary Rich Rominger for his warm introduction.

I would also like to take this opportunity to thank Rich publicly for his support, expert advice and tenacious attitude during the Singapore Ministerial. Rich's presence was extremely valuable to me and my team as we slugged it out with those who want to hold back the hands of time.

Let me start by underscoring up-front this administration's continued commitment to U.S. agriculture. I am well aware of the challenges weface on agriculture and we must be poised to meet them head-on. As part of that commitment, I plan to dedicate more USTR resources to opening agricultural markets abroad, tearing down trade barriers and ensuring reciprocity for US exports. This augmentation of USTR's agricultural staff should pay big dividends in the months and years ahead.

In addition, Dan Glickman and I intend to enhance the coordination between USDA and USTR so that we can maximize our impact and results.

Today, I'd like to touch briefly on the value of trade to our economy and the key role played by agriculture. I will also discuss where we've been on agriculture and where we are going.

THE IMPORTANCE OF TRADE

Economics

During the Cold War, the United States used trade policy as part of a strategy to help rebuild the economies of Europe and Japan and resist communist expansion. During that period, we often opened our markets to the products of the world without obtaining comparable commitments from others.

As the dominant economic power in the world, we could afford to do so. And as part of our "Containment Policy", we needed to do so.

The situation we face today is very different. We remain the world's largest economy -- and the largest trading nation. But our economy, which represented over 40% of the world's output following World War II, now represents about 22%.

Where our economy was once largely self-contained, we are now increasingly interdependent with the rest of the world.

We are only 4% of the world's population and are approaching zero population growth. At the same time, our industries are among the most productive in the world. That means exports are now critical to our economic health and to the vitality of American business, particularly agribusiness.

Each year, American farmers and agribusiness enterprises are significantly more productive due to a combination of hard work and technological innovation. Given the limitations inherent in US demand-led growth, we must find new markets for American Agriculture. We must open markets to support the increasingly productive US agricultural sector.

TRADE OUTCOMES OVER THE LAST 4 YEARS

General Statistics

We have worked very hard over the last few years to open markets on all fronts. Let me cite a few examples:

Exports are at record levels and exports have grown appreciably, especially since 1992.

Goods and services exports (excluding investment earnings) in 1996 were $836 billion, some 35% or $218 billion higher than 1992.

US exports of manufactured products were $523 billion in 1996, or 42% higher than in 1992.

US exports of advanced technology products have grown even faster. They were $155 billion in 1996, some 45% higher than in 1992.

Since 1992, jobs supported by exports rose by an estimated 1.5 million to an estimated level of 11.3 million in 1996. Every billion dollars of US goods and services exports supports approximately 14,000 jobs. (Keep in mind that jobs supported by exports average 13-16% higher than the US national wage average.)

Agriculture Statistics

Let's now turn to and look at some US agricultural statistics.

In 1995, the U.S. set a historical record by exporting $54.6 billion worth of agricultural goods.

This good news continues. The Department of Agriculture reported today that US Agricultural exports this year did even better by climbing to $59.8 billion, another new record. This represents a 40.4% increase in agricultural exports since 1992 when President Clinton took office.

Already today -- one out of every three farm acres in America is dedicated to exports.

50% of our wheat acres, 57% of our rice acres, 37% of our soybean acres, 24% of our corn acres, 35% of our fruit and vegetable acres and 42% of our cotton acres are dedicated to producing product for export. [Note: This is an average of the past three years]

In fiscal year 1996, new highs were reached in fresh, frozen and chilled red meat exports, $4.3 billion, and in poultry meat exports, over $2.4 billion.

Also in 1996, "Consumer-oriented" agricultural exports reached a new high of $20 billion. This is a 32% increase over 1992.

Since 1992, US agriculture has become the single largest net exporter of goods.

These days, we hear a lot about US trade deficits. I'm happy to report that US farmers and agribusiness this last year created an estimated $27.4 billion trade surplus -- the largest ever.

Overall Statistics

The overall statistics are encouraging and they reflect in part an already aggressive campaign to open agriculture markets around the world.

We have fought and successfully ensured that bio-engineered products are getting access to the EU. As part of this effort, the US has urged the EU to begin streamlining its approval process so that GMOs are treated fairly and are consistently, and reviewed on a scientific basis in a timely and transparent manner.

We've used the sanitary and phytosanitary principles in the NAFTA and the Uruguay Round of the GATT to open markets for cherries, citrus, apples and meat. As a result of our WTO case, Korea has converted to a manufacturer's shelf-life system which will significantly open the Korean market to US agricultural products.

U.S. citrus exports are now entering Thailand, Brazil and Mexico, and U.S. apples are being sold in Japan as a result of reduced sanitary and phytosanitary barriers.

During the Uruguay Round, we negotiated new access to Japan for U.S. pork and rice exports. As a result of these negotiations, U.S. pork exports increased 60%. Before these negotiations, Japan refused to purchase US rice. Over the last two years they have purchased approximately 420,000 metric tons of our rice.

During the Uruguay Round we secured market access for U.S. orange and grape exports to Korea.

In 1990, before NAFTA and our bilateral agreements with East Asia, we exported $1.6 billion in beef every year. 5 years later -- after we opened the doors -- we exported $1.7 billion to Japan alone.

Last year beef and veal exports to Mexico alone jumped nearly 80%.

These are but a few recent achievements. This is the good news... but there are also persistent and new problems. These problems must be attacked bilaterally, multilaterally and regionally. Let me turn to each method.

Bilateral

U.S. exports of beef produced with growth promotents are banned by the European Union. We took this case to the WTO, arguing that the ban is a violation of the WTO Agreement on the Application of Sanitary and Phytosanitary Measures of the GATT 1994. We expect the panel report to be issued in May.

The Philippines continues to place barriers in the path of U.S. exports of pork and poultry. We have had enough. We are going to request consultations on this matter.

The EU has not delivered on its commitment regarding the cumulative recovery system for brown rice and certain duty reductions for malting barley. We have requested that the EU's grain import valuation system be put on the agenda of tomorrow's WTO Dispute Settlement Body Meeting.

As you know, some of our fruit and vegetable exports face unjustified sanitary and phytosanitary barriers. We will use the Agreements on the Application of Sanitary and

Phytosanitary Measures in the NAFTA and the GATT 1994 aggressively to eliminate these barriers, and will back up our efforts with dispute settlement consultations where necessary.

Japan continues to require lengthy variety-by-variety testing before it will grant export approval for additional U.S. apple varieties. We will press Japan on this issue at next week's bilateral meeting. If the talks don't yield substantial progress on this issue, we will consider WTO dispute settlement consultations.

Hungary violated its WTO export subsidy commitments in both 1995 and 1996. Despite protracted consultations to get them to comply, they have not. Four countries (Australia, New Zealand, Argentina and the United States) will make second requests for a dispute settlement panel tomorrow.

Multilateral

We see 3 broad areas of multilateral work:

First, we have to challenge instances where countries are not fully living up to their commitments. We will use the WTO Committee on Agriculture to make member countries implement their Uruguay Round commitments and to address emerging agricultural trade problems like tariff rate quota administration, state trading enterprises, domestic support and export subsidies. We will also use WTO dispute settlement and US trade laws where necessary.

Second, all WTO accessions must proceed on a commercial basis. This is as true for China as for the other 30 pending accessions . Regardless of other concessions, agricultural issues must be appropriately resolved or there will be no entry into the WTO. Accession offers must be a good deal for US agriculture.

Third, we need to begin to think about how to prepare for the next round of negotiations, so that the process of reform can pick up where the Uruguay Round left off.

The bottom line is that U.S. agriculture needs to remain committed to the goal of more open world markets, and we need to keep other countries moving in that direction. I can tell you now that this Administration is committed to that task.

We are also committed to using both multilateral and regional strategies to continue to grow U.S. agricultural exports.

At the end of the Uruguay Round, participating countries agreed to continue the process of reform of trade in agriculture beginning in 1999. This commitment was reinforced at the first WTO Ministerial in Singapore in December.

Regional Initiatives

We intend to move countries forward in this direction in our regional trade negotiations too.

Under the umbrella of the Free Trade Area of the Americas (FTAA), three hemispheric working groups have been created that will focus directly on agricultural interests. One group will address market access, another sanitary and phyto-sanitary issues, and a third will address anti-dumping and countervailing duty issues and subsidies. We will ensure that the work done by these working groups reflects this administration's strong support for US agriculutral trade interests.

The immediate objective of the Administration is to ensure that the Trade Ministers decide on how and when to launch these negotiations. This hemisphere is our single largest and fastest growing market. We must compete in it head-on.

We believe that it is critical that the United States help shape the free trade agenda in the Americas by working with Chile to lay the cornerstone to the Free Trade Area of the Americas. Further progress in our negotiations with Chile is directly linked to the Congress granting the Administration new fast track authority. Authority US agriculture has always supported. Of course, Chile maintains restrictions on US wheat, beef and poultry and these issues will have to be addressed.

We also hope to use the Asia-Pacific Economic Cooperation Forum (APEC) to shape the free trade agenda in the Pacific Rim. APEC economies account for over half of the world's GDP. Nearly 43 percent of our agricultural exports go to Pacific Rim countries.

Last year, the APEC member countries laid the foundation to achieve free and open trade and investment by the year 2010 for industrialized economies and 2020 for developing ones. APEC's commitment to comprehensiveness means that no APEC economy can exclude agriculture from the goal of free and open trade. This year, an APEC task force will complete the analytical work that will help determine how best to move forward toward this goal.

CONCLUSION

President Clinton has fought hard to expand free and fair trade. Market opening initiatives have been and will continue to be the driving force of international trade policy. Future prosperity on the farm, in the countryside and in our nation's cities depends on our continued success in opening up new markets and tearing down trade barriers. Failure to do otherwise would hurt farmers, city dwellers and our nation as a whole.

OUTLOOK FOR U.S. AGRICULTURE

Keith Collins
Chief Economist, U.S. Department of Agriculture

This presentation opens the door to fuller discussions of the outlook for U.S. and world agriculture to take place over the next two days. My remarks provide an overview of agricultural markets for the near-term and the implications for the U.S. farm economy. I will also discuss in a little more detail several key puzzling issues related to this outlook. They include grain prices, planting flexibility, ethanol production, the cattle cycle, and price volatility.

Over the last 2 years, this forum has emphasized the longer term outlook and I have summarized that in my past comments. This year, once again, we are making available to participants an outstanding document that presents a detailed assessment of the next 10 years. I will not summarize that today because, for the first time, we are incorporating into the regular program a special session on the 10-year outlook to be presented tomorrow. I want to recognize the Economic Research Service for the critical role they play in the development of the long-term analysis and its preparation. Without them, we would not have this long-term view.

Macroeconomic Environment

One can go a long way in addressing the prospects for agricultural markets by knowing how strong world food demand will be and knowing how global crop yields will turn out. Although we can say little of yields for 1997, we can say something about underlying demand strength by looking at its two major determining factors: global incomes and prices.

Global incomes look like they will support strong food demand in 1997, which is good news for food exporting nations such as the U.S. Real global Gross Domestic Product (GDP) increased 1.9 percent annually during 1990-1995. Last year, it rose 2.9 percent, and that helped keep global food demand strong despite high commodity prices. In 1997, world GDP is again expected to grow near 3 percent, providing another firm base for food demand. In Europe, recovery from the slowdown in 1996 is expected to boost GDP, but a downside is Japan, where GDP is expected to be cut in half from the 1996 level, as the stock market declines, taxes increase, and banking sector difficulties continue.

In developing economies, where income growth drives food demand, GDP is expected to grow at about the same as 1996's 5.5 percent. Asian growth may slow a little but be offset by improvements in Latin America. For example, in 1997, Mexico's real GDP is forecast to rise over 4 percent, compared with a 7 percent decline only two years ago.

Almost every major country in the world is expected to have positive real growth in 1997. Each of the 28 OECD economies is expected to grow for the first time in 10 years. The only drag continues to be the Former Soviet Union, where positive growth is still a couple of years away.

From a consumer's viewpoint, global incomes look favorable for 1997, and the same can be said for global commodity prices. At the end of 1996, U.S. export prices for all commodities were still strong relative to the early 1990's averaging about 12 percent above the 1990-95 average. However, during the second quarter of 1996, U.S. farm product export prices were nearly 35 percent above the average of the first half of the 1990's, so the prices global buyers are facing are coming down and should continue to do so as grain supplies rebuild in 1997.

One price factor to watch in 1997 is exchange rates. The dollar is now about 20 percent stronger against the yen than it was in 1995. That has the effect of raising U.S. export prices and will partly offset some of the U.S. crop price declines in 1997. It will especially hurt meat and other high value exports whose prices are not dropping in 1997. Some positive news for U.S. exporters is that although the dollar is strengthening generally, its real value, in agricultural trade-weighted terms, is now only moderately above the level of the past two years when measured against West European currencies and Asian currencies, excluding Japan. And the Mexican peso continues to show stability at about 7.9 pesos per dollar.

The stronger dollar will also add to the U.S. trade deficit which will be a restraining factor on U.S. economic growth. Even so, the U.S. economy is expected to grow at nearly 2.5 percent during 1997. Two related important underlying factors are energy prices and interest rates. Farmers faced 11 percent higher fuel costs in 1996, spending a total of $6.3 billion, as crude oil prices rose from $17 a barrel in 1995 to over $22 in late 1996. Fuel spending will be up a little in 1997, but we expect crude oil prices to drop back down toward $20 as the year unfolds.

On the interest rate front, there could be a slight rise in 1997 reflecting the above-trend GDP growth of the past few quarters and the tighter labor market which could boost wage gains. However, the outcome will depend on the Federal Reserve, which must also consider the offsetting effects of lower expected food and energy price increases and lower prices for imports due to the strength of the dollar. Farmers' total interest expenses will be a little over $13 billion, about the same as the past 2 years. (Tables 1 and 2 provide summary performance indicators for U.S. agriculture.)

Market Developments

Grain, soybeans and cotton. A year ago, this forum was deeply concerned about the looming shortage of grains and the prospect for a major disruption of livestock production and escalating consumer food prices. We had seen a 10-16 month run-up in corn, wheat, and soybean prices and were expecting further price increases Grains did turn out to be in short supply, and prices soared to levels not predicted at this forum or anywhere else, as grain stocks reached record or near-record lows and domestic and export demand was strong.

Now, a year later, the moderating effect of larger 1996 crops is evident. Monthly average farm-level wheat prices have fallen steadily from the record high last May to below $4.00 per bushel in January--a 31 percent drop. Corn prices have declined by about 41 percent from the record high last July but leveled out to $2.63 per bushel in December and January. In contrast, soybean prices which peaked in August, but not at a record level, declined 12 percent through November but have increased since then to $7.16 per bushel in January.

Where do we go from here? Wheat prices are expected to remain under considerable pressure as U.S. and global carryover stocks rise, although not to high levels by historical standards. Last year's high wheat prices caused foreign wheat acreage to expand by 5 percent which resulted in the harvest of record or near-record crops. That was the largest annual increase in foreign wheat area recorded in our database which starts in 1960. This increase, and reduced yields, made the U.S. the only major wheat exporter with a decrease in wheat supplies in 1996/97. So, U.S. exports had to decline, we said so, and sales have plummeted in recent months as foreign exporters, such as Argentina and Australia, have been aggressive exporters. U.S. sales are expected to remain slow through this summer because of large exportable supplies in competing exporters.

For the 1997/98 season, we expect U.S. production similar to this year. However, smaller crops are expected in all the major competing exporters except the EU. This should provide an opportunity for a recovery in U.S. exports. However, the degree of a recovery from the reduced level of 950 million bushels expected this season will depend importantly on the size of our crop, and on whether China's wheat imports bounce back from the 4 million tons of imports expected this season to something nearer the 10-million-ton average imports of the previous 5 years.

Outlook Puzzle #1--How low will wheat prices go?

Averaged over 1980-95, farm prices for wheat bottom out at about 94 percent of the season-average price in July and peak at 106 percent of the season-average by May (figure 1). Based on the forecast season-average price for wheat of $3.45 per bushel for 1997/98, monthly prices would reach a low of $3.25 per bushel in July and then rise to $3.65 by May 1998 (figure 2). However, in years of significant stock growth since 1980, that is, when stocks rose 20 percent or more from the previous year, wheat prices exhibited a different pattern, starting higher and declining more early in the crop year, and reaching a trough in late summer before generally rising through May, but below the price-pattern levels average over all years. Under this stocks-growth pattern, 1997/98 wheat prices would bottom out at about $3.35 in September and rise to $3.55 in May 1998.

This year's corn prices may be relatively firmer than wheat. While corn carryover stocks are expected to more than double by September, they are still expected to be below 1 billion bushels, which is relatively tight. And, feed and industrial uses are rising. However, exports will be down

this season as corn from Argentina, South Africa and China, and barley from Canada and the EU, are causing increased competition. In 1997, U.S. production is forecast to rise again, but higher exports and domestic use are expected to limit another increase in carryover stocks by September of 1998 to only around three hundred million bushels.

Outlook Puzzle #2--Will ethanol perform?

High corn costs caused corn used in ethanol to fall 26 percent in 1995/96 to 396 million bushels from 533 million the year before. Corn costs will be lower this year and gasoline prices a little higher than in recent years, so a recovery to 440 million bushels is expected for 1996/97. Further gains are expected in 1997/98, but it will likely be at least another year before use returns to the 1994/95 level. The peak ethanol production period is in the fall and early winter when HFCS production is down and the winter oxygenate program is in effect. Unfortunately, ethanol production this past fall did not snap back sharply, which limits the prospects for this season, but year-over-year production increases are likely as the year progresses. While the corn used in ethanol between 1994/95 and 1996/97 is expected to drop about 90 million bushels, corn used in HFCS and beverage alcohol is expected to rise about 60 million. Increasing HFCS and beverage alcohol exports will help support corn industrial use while ethanol recovers.

Soybean stocks are going in the opposite direction of wheat and corn. By this September, soybean stocks are projected at the lowest level in 20 years, which will mean an increase in farm level soybean prices in 1996/97. What is going on? First, Brazil had a reduced crop last year, which opened markets globally for the U.S. and even made Brazil a U.S. customer this past fall. Second, China imported record quantities this fall. During the fourth quarter, China bought 950,000 tons of soybean meal compared with zero the year before. That is nearly 8 percent of total world trade purchased in one calendar quarter by one country. China's needs now appear to be met, and with record soybean production in both Argentina and Brazil now coming on, U.S. exports are expected to slow during the March-September period. In 1997, a modest increase in production is expected and a return to a more typical export level, which should raise 1997/98 carryover stocks.

For cotton, the extremely tight stocks of last summer, which led to 800,000 bales of U.S. cotton imports, making the U.S. one of the world's largest cotton importers, are now behind us. Imports have slowed to a trickle as the U.S. has just completed harvesting the second largest crop ever. U.S. mill use is up with the continuing strong economy, cotton textile exports are up and imports down. Stocks, however, will rise 80 percent by August, as cotton exports have fallen in the face of 10 straight years of flat global demand and smaller imports by China. In the western hemisphere, cotton use continues to grow, but elsewhere in the world, growth in textile demand is

increasingly being met by manmade fiber, a challenge the U.S. cotton industry must deal with if exports are to grow in the future.

Other crops. Among other crops, rice has taken a surprising turn. Reflecting reduced returns to planting under the 1996 Farm Bill, 1996 production and exports are down, as expected. However, late harvests in Asia and tight long grain supplies worldwide have boosted prices and some suggest U.S. rice area may even increase in 1997. For sugar, the major development is the level of imports in 1996/97, which is now expected to total 2.27 million short tons, after the January TRQ allocation of 220,000 tons was canceled because the forecast U.S. stocks-to-use ratio was above 15.5 percent. Imports remain well above the Farm Bill trigger for recourse loans of 1.5 million tons. Among fruits and vegetables, the recent Florida freeze demonstrates weather will play a critical role in production. Sharp losses of snap beans, squash, tomatoes and peppers have boosted prices and will likely cause the CPI for fresh vegetables during January to June to be more than double the increase expected before the freeze.

Outlook Puzzle #3--What will farmers plant this spring?

In 1996, 335 million acres were planted to principal crops, the highest level since 1986, and up about nearly 17 million acres from 1995. With producers responding to rising prices, corn and wheat acreage accounted for 90 percent of the increase, sorghum and soybean acreage were also up, and rice, cotton, and minor oilseed acreage were down.

Cropland available for 1997 planting to principal crops is as large as last year, and in addition, as much as 1-2 million acres withdrawn early from the CRP in 1996 might be planted. About 22 million acres currently enrolled in the CRP are under contracts that expire at the end of September and some of that acreage is likely to be available for 1998 planting but not 1997.

Planted acreage this year is likely to be down slightly from 1996 largely because of plantings of other crops on failed wheat acres last year. Land that is planted to wheat, then replanted to another crop, such as sorghum, is counted twice in the planted acres total. Total wheat acreage is expected to be down because of the 7 percent decline in winter wheat acreage and lower price expectations than a year ago for spring wheat plantings. Corn and soybean acreage is likely to increase capturing some of the wheat land. Corn could total 81 million acres, near where it might have been last year had planting weather not been bad. Soybeans, with current favorable prices, could reach 64.5 million acres, or even exceed 65 million, the highest since 1984. Rice acreage with favorable prices may increase marginally to 2.9 million, and cotton acreage could decline slightly to 13.8 million, as feed grains and soybeans look attractive.

Although larger stocks of wheat and corn will be carried into 1997/98 than a year earlier, U.S. grain stocks are relatively tight and soybean stocks are the lowest since 1976. With normal weather, 1997/98 could see wheat production the same as 1996's 2.28 billion bushels and stocks rise toward 550 million bushels. Corn production could total close to 9.6 billion bushels, the second highest ever, and stocks rise to more than 1.2 billion bushels. Soybean production could total 2.5 billion, and with lower exports, stocks could rise to 220 million bushels. Season-average prices would be below 1996/97 and export supplies (total supply less domestic use and normal carryover stocks) would rise. But, U.S. crops will face especially strong competition given large competitor supplies.

Livestock and poultry. One of the most startling developments in the recent outlook has been in the cattle market. First, the cattle cycle turned, and second, the export boom went flat. Over the past year and a half, drought, record-high feed grain prices, high hay prices, low cattle prices and adverse winter weather have persistently forced cows to slaughter. In 1996 beef cow slaughter rose 24 percent and calf slaughter also rose 24 percent. Large late summer and fall placements into feedlots are keeping beef supplies up now. The January 1, 1997, U.S. cattle inventory showed the impact of ranchers' efforts to reduce herds. There were 103.5 million cattle on farms and ranches at the start of 1996 and 101.2 million at the start of 1997, the first decline in the U.S. cattle inventory since 1990.

Adding to the grief of ranchers, exports weakened during the second half of 1996. Exports in the first half of 1996 were more than 20 percent above a year earlier, but second- half exports declined about 12 percent.Exports increased at an annual average rate of 16 percent during 1991-95. In Japan, where more than half of U.S. beef exports went in 1996, concerns over E. coli and BSE appear to have slowed consumption. In 1997, U.S. beef exports are expected to rise, especially in the second half, particularly to countries like Mexico and South Korea and to Japan although the rising dollar is a new factor that could limit increases.

Outlook Puzzle # 4--What are the risks of the downhill part of the cattle cycle?

This 101 million head inventory on January 1 marks the start of the downturn in the cattle cycle. Cattle cycles over the past several decades have averaged 6 years of cattle numbers building followed by 4 years of numbers declining. So, for sometime into the future, we will see fewer calves born, fewer heifers retained, fewer feeder calves available to feedlots, fewer steers fed and fewer slaughtered and lower retail supplies of beef. This could go on for several years. In 1996, beef production was up 1.2 percent. In 1997, we expect a slight decline, and in 1998, a decline of 4 to 5 percent. The upshot is feedlots will have to pay more for a reduced supply of feeder cattle. If corn prices come down, feedlots will want feeder cattle even more. Feeder cattle prices could become quite strong next fall and into 1998. By late 1997, fed

cattle could be over $70 per cwt, as they were this past fall, but feeder cattle could be in the mid-$70, compared with the mid-$60's this past fall. This will mean better news for cow-calf producers. After taking losses estimated at $18 per cow in 1995 and $39 in 1996, returns could recover in 1997 but are still expected to be negative. By 1998, returns should be strongly positive and that would provide and incentive to rebuild herds. But once that decision is made, the biological lags mean another 2-3 years before cattle inventories stop the decline.

Now combine this story with the fact that grain stocks, particularly corn and soybean, remain relatively low. A bad weather year in 1997 could again cause high feed prices, resume the heavy herd liquidation, stop rebuilding of the hog breeding inventory, and set the stage for a serious increase in retail beef and other meat prices in 1998. Because meat and poultry accounts for 15 percent of the at-home CPI for food, such a scenario would truly be a consumer concern.

Hogs and poultry. Very briefly, the hog inventory, like cattle, is down compared with a year ago and pork production in early 1997 will likely be below last year's level. Producers indicated plans to increase farrowings in the first quarter of 1997 then reduce them during the second. If they follow through, pork production would pick up by the third quarter but for the year as a whole, remain about the same as in 1996. With production stable and increased exports expected, hog prices may average about $2 per cwt over the 1996 average of about $53.50 per cwt.

Broiler exports, fueled by economic growth around the world, and like beef and pork exports, have been another remarkable story in the 1990's that will continue in 1997. Exports were equal to 6 percent of U.S. production in 1990 and over 17 percent in 1996. After record high broiler prices in 1996, feed costs coming down, and firm meat prices in 1997 as beef and pork production do not increase, broiler production is expected to rise 6 percent this year. Poultry will account for all of the increase in 1997 U.S. meat production. Exports are forecast up again with Russia, Hong Kong, China and Japan, the major buyers.

Dairy. The last major market I want to profile is dairy. Farmers' milk receipts were a record $23 billion in 1996, making milk one of agriculture's major commodities. Although many producers enjoyed record-high incomes, many did not, particularly those facing high feed costs, poor forage and low productivity. In addition, milk prices fell sharply between September, when a record high was reached, and December. For the 1995/96 marketing year, the all-milk price averaged a record-high $14.42. In January 1997, it was $13.60, 40 cents below a year earlier. This price is likely to go lower over the next couple of months. Dairy producers are expressing much concern over the decline and calling for various forms of Federal action. Given the direction of Federal policy toward greater reliance on the market, will the market improve for dairy producers? We think so. Milk production for the calendar year 1997 is forecast to rise only 1 percent over 1996, which itself was down 1 percent from 1995. So the market is in balance with milk

production rising with population, and government surplus removals on a milkfat basis expected to be about 0.6 billion pounds, the second lowest in the last 27 years. In that environment, the all-milk price will follow the Basic Formula Price up this spring and average $13.70 for the calendar year, the second highest level in the past 16 years.

Dairy producers sell a seasonal perishable product with little use of options, futures or forward pricing arrangement. The price changes dairy producers have faced this year brings me to a concluding concern for this forum.

Outlook Puzzle #5--Is price volatility really more of an issue today?

With elimination of acreage reduction programs, low and capped marketing loan rates, and minimal government stocks, some are concerned that prices will be more volatile. This concern has been amplified by tight grains stocks and the run up and decline in grain prices over the past 2 years. This, in turn, has affected livestock, poultry and milk markets. A premise is that prices will be more volatile without government intervention and with privately-held stocks that are smaller than past levels owned or supported by the government.

Are prices now more volatile than in the past? One simple measure is based on the coefficient of variation of monthly and annual average farm prices (tables 3 and 4). Using this measure, over the past four decades, the 1970's had the greatest intra-year and year-to-year price volatility for major commodities (see tables). Domestic supply- and export demand shocks in the early 1970's led to high price volatility throughout the agricultural sector. The 1970's were similar to the 1980's in that dependence on foreign markets was great, stocks fell, government intervention was limited, and land uses returned to production from the Soil Bank. In the 1980's, prices were less volatile than in the previous decade and volatility for most commodities thus far in the 1990's has been about the same or less than in the 1980's. This review does not provide much information about future price volatility and the consequences of much less government intervention. For corn and wheat, both farm and futures prices were more volatile in 1996 than over 1991-95. Whether this is indicative of more volatile prices in the years ahead remains to be determined.

Even so, farmers and first buyers have reason to be concerned. Greater planting flexibility, trade liberalization, and more private stockholding tend to be stabilizing forces. But several factors suggest greater variability in the future. They include: smaller government stocks, greater exposure to foreign policy shifts and foreign supply shocks as trade liberalization becomes more important, and increased frequency of weather problems.

From a producer perspective, more volatile prices than in the past could signal a need for risk management tools to deal with price and income variability. Whether or not prices will be more volatile is uncertain. However, producers can no longer transfer price risks to the government through high nonrecourse loan rates and storage subsidies. Instead, they will rely on private sector risk management mechanisms, a key subject of this forum.

Implications for the State of the Farm Economy

Entering 1997, the U.S. agricultural economy is in a relatively strong position. Areas of concern continue to be producers in regions affected by bad weather and cattle and dairy producers who have had to reduce cash balances or incur debt to withstand financial pressures in 1996. Farm cash receipts set a record of nearly $200 million in 1996, with crop receipts rising well above the average of the 1990's and livestock receipts at about the average. This year, total receipts are likely to decline a little, as lower grain receipts reduce the total return to crops. Livestock receipts will rise as cattle more than offset the decline in dairy. Overall production expenses will rise a little but be held in check by lower feed costs. Consequently, net cash farm income is forecast to decline to about half way between the $57 billion of 1996 and the $49 billion of 1995, making it about equal to the average of the 1990's.

The farm sector balance sheet is expected to improve again in 1997 as asset values rise more than debt increases. Farm real estate values have risen every year since the mid 1980's and a 5-percent increase is expected in 1997. Farmers will take on more debt for the fifth year in a row but the overall debt-to-asset ratio is expected to decline to a healthy range of 14.5-15.0 percent.

Taxpayers will see stability in farm program costs with direct government payments, forecast at $7.6 billion for 1997, would account for only 3.5 percent of gross farm income. By the expiration of the 1996 Farm Bill, government payments are expected to drop to 2.6 percent of gross farm income.

Consumers will see a year of modest food price inflation in 1997. In 1996, food prices rose 3.3 percent above the 1995 level but below what many expected, given the record high levels of grain and milk prices. Meat and dairy product prices will restrain food price increases, keeping them in the range of 2.5-3.0 percent.

In 1997, American agriculture will continue to adjust to the increasing risks that accompany changes in domestic farm and trade policy as well as the profusion of new technologies and marketing arrangements that are emerging. These risk-creating changes will also provide the chance to lower costs, improve products, shift risks and open new markets internationally.

TABLE 1. ECONOMIC INDICATORS FOR U.S. AGRICULTURE (billion $)

Item	Avg. 1990-94	1995	1996f	1997f 1/
Farm receipts 2/	181.7	185.7	200.4	193.7
Assets	879.5	978.0	1,035.3	1,094.1
Liabilities	140.6	[illegible]	155.3	159.0
Equity	738.9	827.2	880.0	935.1
Farm real estate ($/acre)	723.0	832.0	890.0	na
Exports	41.3	54.6	59.8	56.5
CCC outlays (fiscal year)	10.6	6.0	4.6	7.8
Government payments	9.6	7.3	7.8	7.6

f=forecast

1/ From "Agricultural Baseline Projections to 2005, Reflecting the 1996 Farm Act," USDA, February 1997. 2/ Includes farm-related income.

TABLE 2. RETURNS ($/unit) 1/

Item	Avg. 1990-94	1995	1996e	1997f
Corn (acre)	167.18	192.17	202.85	197
Wheat (acre)	88.26	97.55	115.05	80
Soybeans (acre)	133.32	163.05	185.40	175
Cotton (acre)	224.30	149.95	286.00	226
Hogs (100 lbs)	6.98	5.42	11.03	13.47
Cow/calf (per cow)	86.33	-17.68	-38.98	-27.21
Chickens (100 lbs)	4.84	7.59	4.40	4.59
Dairy (100 lbs of milk)	2.33	2.16	2.26	2.04

e=estimated f=forecast

1/ Crops--return over variable costs for program participants and soybean producers for crop years; cow/calf, dairy and hogs (farrow-to-finish)--returns over cash costs with dairy on marketing years; chickens--returns over total costs.

TABLE 3. INTRA-YEAR PRICE VOLATILITY (COEFFICIENT OF VARIATION) 1/

COMMODITY	1951-60	1961-70	1971-80	1981-90	1991-95
WHEAT	.035	.061	.130	.077	.089
RICE	.063	.033	.124	.120	.119
SOYBEANS	.064	.054	.123	.089	.058
CORN	.061	.045	.110	.103	.081
COTTON	.050	.067	.102	.071	.043
CATTLE	.050	.051	.066	.034	.055
HOGS	.094	.093	.118	.092	.099
MILK	.073	.056	.056	.043	.045

1/ Coefficient of variation of monthly farm prices (calendar year) averaged across multi-year periods

TABLE 4. YEAR-TO-YEAR PRICE VOLATILITY (COEFFICIENT OF VARIATION) 1/

COMMODITY	1951-60	1961-70	1971-80	1981-90	1991-95
WHEAT	.073	.178	.308	.150	.155
RICE	.078	.017	.278	.193	.147
SOYBEANS	.127	.067	.222	.150	.088
CORN	.163	.070	.258	.180	.180
COTTON	.067	.165	.270	.080	.180
CATTLE	.219	.124	.297	.114	.069
HOGS	.154	.161	.238	.083	.080
MILK	.060	.126	.248	.042	.023

1/ Coefficient of variation of annual average (calendar year) prices over multi-year periods.

Figure 1

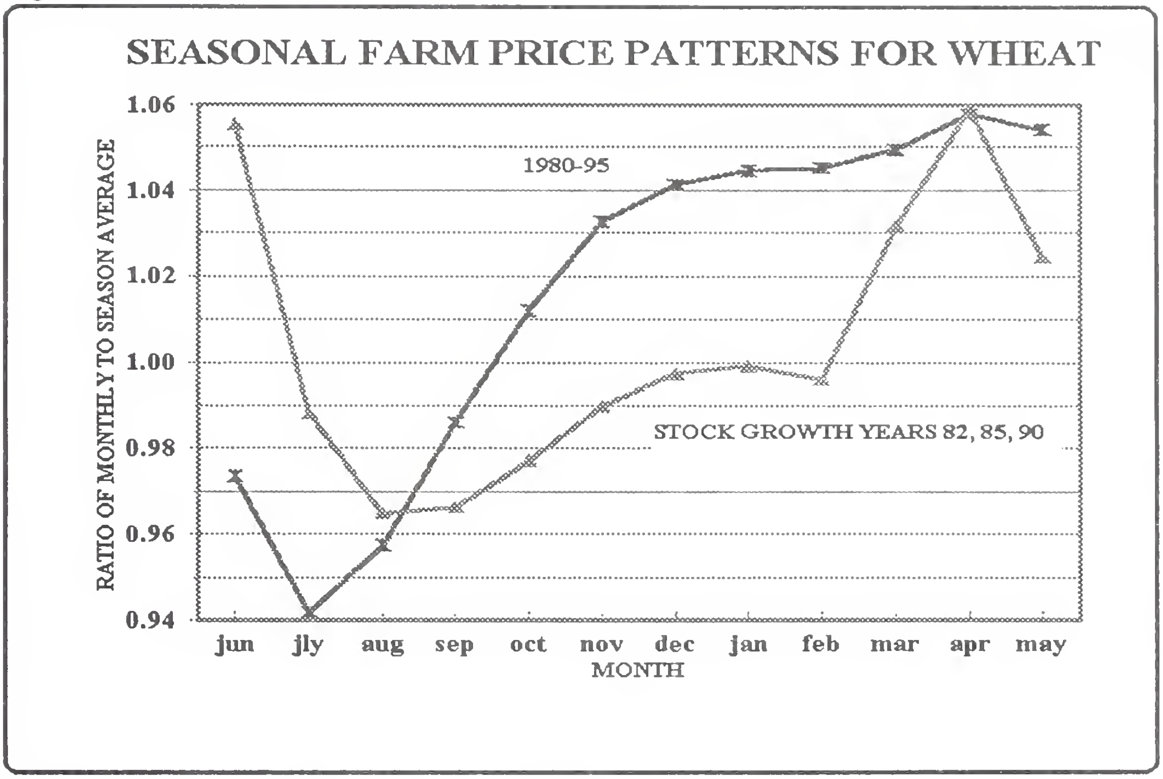
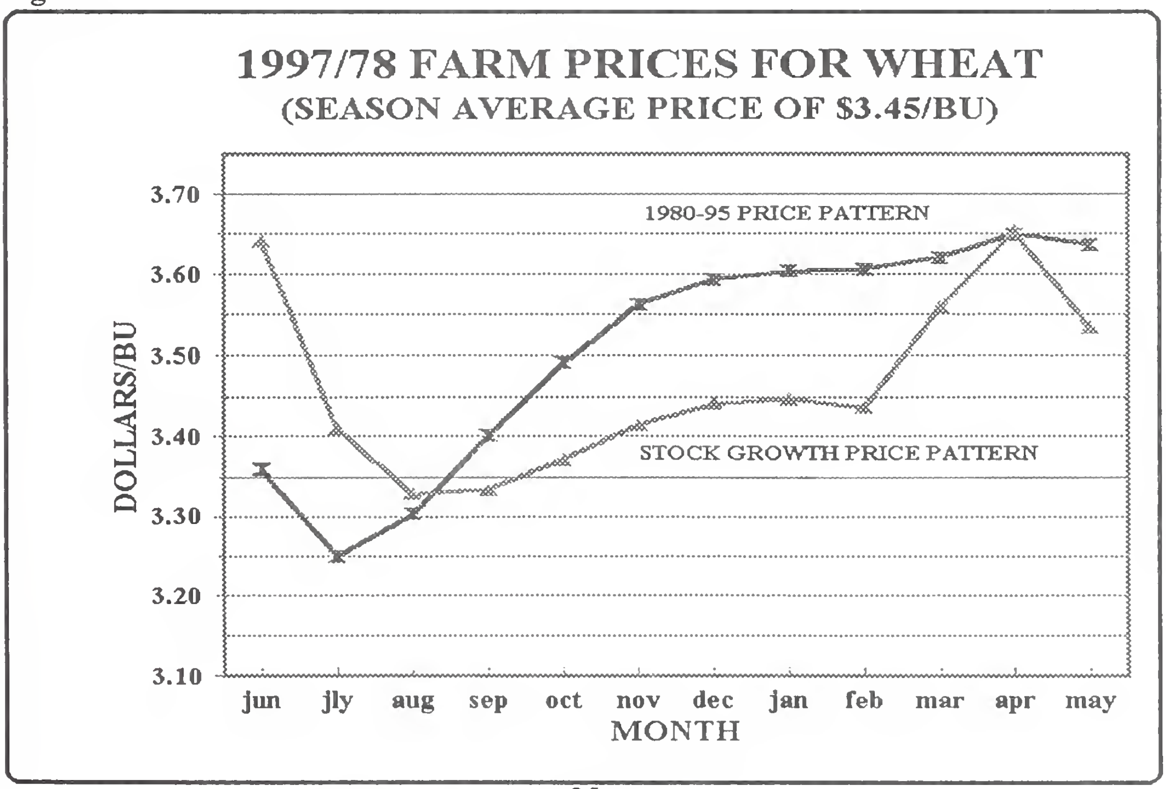


Figure 2



Agricultural Outlook Forum — For Release: Monday, February 24, 1997

WHAT'S AHEAD FOR AGRICULTURE?

Michael V. Martin, Dean
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and Environmental Sciences
University of Minnesota

Thank you for the invitation to participate in this very important conference. My comments are offered from the perspective of a midwest land-grant university dean whose professional background is economics. The point is, I may not have fully representative views, but I will share them nonetheless.

Over the next decade, a number of complex forces, many yet unknown, will shape and continually re-shape American agriculture. I'll focus on six that are of particular relevance to those of us in land-grant universities.

1. Structural Change - We are witnessing dramatic structural change at the farm level, particularly in livestock agriculture. The poultry industry, of course, went through a period of consolidation some time ago. The swine and dairy industries are now experiencing similar change.

In the midwest, we've seen the number of farms decline while the number of animals has remained constant or increased.

This consolidation and restructuring is engendering a spirited debate over family vs. factory farming. There are many who believe that the emergence of large scale livestock operations, while understandably based on economic considerations, may have significant social and environmental impacts. The controversy over siting or expansion of large animal units is creating conflict within and between rural communities. In Minnesota we have two counties which have banned expansion of livestock farms. The legality of these bans is still in question.

The environmental concerns are, at least theoretically, measurable and ultimately, solvable. The social considerations are much less specific and accent the intense differences in values. As a consequence, no obvious solutions are available.

Consolidation in livestock production has also highlighted differences, or presumed differences, in state level environmental regulations. Shifts in production between states are often attributed to differences in environmental regulation. For example, leaders of Minnesota's swine industry are convinced that North Carolina's emergence as a major swine producer is primarily the result of over regulation at home and/or under-regulation in North Carolina.

And, land-grant universities are caught in this controversy as well. If we conduct research aimed at mitigating the negative environmental effects of large-scale livestock units, we are accused of advocating consolidations. If we ignore these issues, we are accused of abandoning commercial agriculture and significant social concerns. It's a tricky situation indeed.

Dramatic structural change is also occurring in critical parts of the agricultural input sector. Of particular importance is the rapid consolidation, even oligopolorization in private sector agricultural biotechnology development.

A few large firms have acquired or are acquiring ownership of core biotechnology. While they may bring substantial economies of scale to research and development, they may also conduct business in a profit-maximizing but, some might argue, a socially unacceptable manner.

The ability to own and control powerful, living technologies offers great promise but also prompts great concern. Ensuring that the public interest is protected is a serious public policy matter.

Which leads me to a second force shaping the future of American agriculture.

2. Emergence of Biotechnology - The biotechnology revolution is only just beginning. Still, it holds the promise for enormous change in agricultural production and productivity. Traditional crop breeding and animal improvement programs are giving way to genetic manipulation and engineering. Plant and animal disease control, new product development and environmental protection may be altered substantially through the applications of biotechnologies.

Biotechnology is changing public-private research relationships. The extremely high cost of biotechnology research will lead to two or maybe three levels of land-grant university status: (a) those who have the means and can realize the benefits of this research, (b) those in an ancillary role to the first tier research institutions, and (c) those left behind.

The public institutions which remain central players in biotechnology research will do so because they have struck appropriate and functional partnerships with private sector firms. They will be legally complex, scientifically interrelated and politically hazardous.

Applications of biotechnology could exacerbate problems of international inequality and conflict. Recent decisions by the European Community to block imports of biotechnology enhanced agricultural products may be a harbinger of things to come. Differences over biotechnology may become another form of non-tariff trade barrier. Nations that control biotechnology may dominate those who do not. There is no certainty that biotech will not lead to further global inequities.

And, as already suggested, biotechnology is accompanied by a very complex and controversial set of ethical, legal and environmental questions.

3. System Sustainability - The terms "sustainable" and "sustainability" carry considerable baggage in some circles. Still, it is clear that we must develop technologies, management approaches, strategies and policies which will allow for the intergenerational transfer of an economically viable, socially stable, environmentally sound and highly productive agricultural system. Moreover, this broad definition of "sustainable" must be applied across a complex agricultural input, production, processing and distribution system.

Pursuit of a systems approach to sustainability will require continuous change, innovation and adaptation across all activities and functions of food, fiber and energy production.

4. Rural Infrastructure Constraints - Among the major constraints to continued growth and development of American agriculture is a rural infrastructure, physical and institutional, under considerable strain. Rural roads, bridges and communication technologies will demand substantial investment if we are to remain competitive in global markets and enhance rural socio-economic viability.

Needs for physical infrastructure are fairly easy to identify and quantify. Though they are very expensive, needs for social or institutional infrastructure are much less obvious but no less important. Farmers and other rural citizens require access to education, health care, information and social services. For all the well known reasons, provision of these is a major fiscal and logistical challenge.

5. A Shortage of Human Capitol - As agriculture, broadly defined, moves through substantial change and transformation, perhaps the single most binding constraint to genuine progress will be a shortage of well educated, adaptable management. A complex set of social and demographic factors have given rise to a very steep decline in the number of young people entering the work force with "farm backgrounds." In our case at the University of Minnesota, less than 25 per cent of the students entering the College of Agricultural, Food, and Environmental Sciences are from farms. Very few intend to return to production agriculture. Many seek opportunities only peripherally related to agriculture.

Over the past five decades, agriculture has released an enormous management and work force to other sectors and industries. We may now have reached a point where some reverse flow must occur.

We understand the complex challenges associated with remaining globally competitive, environmentally sound and technologically advanced in agriculture. We will need managers across all functions of the agricultural and food system who

can meet these challenges. Failure to supply a cadre of well-trained, creative and adaptable managers will do serious harm to this essential sector.

6. The Urgent Need for a National Agricultural Research Policy - American agriculture has benefited from a long-term commitment to research and technology transfer. A system which dates back to 1862 has performed admirably.

But, we are at a turning point in U.S. agricultural research. There is a pressing need for a new comprehensive agricultural research and technology transfer policy. Land-grant universities, Agricultural Research Service and other research institutions are competing for the declining pool of public funding. Agendas of the U.S. Department of Agriculture, the National Science Foundation, The National Institutes of Health and other research funders are uncoordinated and lack common themes and objectives.

As the private sector sponsors a larger share of university food and agricultural research, public and proprietary interests become intertwined. Increasingly, private funders are leveraging public funds for primarily private benefits. This represents an inversion of the traditional relationship.

We have reached the point where a comprehensive agricultural, food safety and nutritional, environmental and international research policy must be developed. It must set out a larger research framework and identify resource needs.

Recent legislative initiatives have focused on increased oversight and accountability but have focused little attention on the broader directions and goals the larger research. I fear we are being held more accountable for less meaningful outcomes.

Summary and Conclusion

We know that agriculture is now adjusting to a new policy regime, the 1995 Farm Bill and the accelerating globalization under NAFTA, GATT and other agreements. Over the next few years, we will see the consequences of policy deregulation. At the same time, pressure from environmental interests, animal rights groups, preservationists and others will force changes in management at the farm level and elsewhere.

In the longer term technology development, transfer and adoption and other more fundamental investments, will be a central force re-shaping the complex agricultural sector. The ways it will be re-shaped cannot now be determined. But, real change is occurring and will continue.

RISK MANAGEMENT IN AMERICAN AGRICULTURE

Remarks by
B.H. Robinson, Administrator
Cooperative State Research, Education,
and Extension Service

Good afternoon, and welcome to the USDA's Agricultural Outlook Forum. It is my pleasure to moderate this session on Risk Management in American Agriculture. I come here as a strong supporter of programs to deal with change, risk, and the new order in agriculture. Change is the name of the game in agriculture these days. Not surprisingly, much of that change means more and different risk for U.S. farmers and ranchers. Managing that risk concerns them greatly.

That is why we are here today: to consider how we can together address the many new and different risks farmers and ranchers face, especially in a climate much more free-form and market oriented. Partnership is a must. We do our best when in partnership with experts such as those in USDA's Risk Management Agency, the Commodity Futures Trading Commission, with industry, and, of course, with farmers and ranchers and their organizations.

Recently, speaking about the formation of the new USDA Risk Management Agency, Secretary Glickman stated that the "U.S. Department of Agriculture needs to step up our farmer education efforts in the whole area of risk management." Risk management is one of the issues that Secretary Glickman has raised as a critical issue.

The declining government commodity program "safety-net" is now an accepted fact. The FAIR Act set that process in motion. Although FAIR is a major influence, it is not the only contributor to risks farmers face. We need to think about risk in broad terms. Major shifts are occurring not only in government commodity programs, but also through the process of the industrialization of agriculture and of reorganization, concentration, and globalization of markets. Changes in technology, environmental and health concerns, and rapid spread of

pests and disease are other essential factors to consider. Producers respond to these changes in many ways. They are experimenting with new enterprises, finding new ways of doing business; using new technologies and practices; making new financial and other commitments. In the process, they are changing the character of old risks and creating new ones, and, developing new management strategies.

Because we cannot predict future events with certainty, no one can eliminate all risk. Moreover, it would not be desirable to do so, because profits are a return to risk taking: "nothing ventured; nothing gained." Successful farm and ranch management depends on taking risk consistent with the goals and financial position of the individual business. Producers and other agricultural firms need to reconsider their risk management portfolios continually, not just once in a while. In doing so, they must rely on a logical process to identify risks, assess these risks' importance, evaluate alternatives, and implement what alternatives they select.

Our purpose today is to explore some emerging tools available to help manage agricultural risk. We'll look at some tools and their use - not as the final answer, but as a beginning dialogue between researchers, the government agencies that provide some of the tools and that regulate the use of others, the private sector providers of the tools, and most importantly, with the farmers, ranchers, and merchants who must rely on their use. We have assembled a distinguished panel, well qualified to address the topic.

Let me briefly provide some background for what we'll discuss during this session. While risk protection from government commodity programs is declining, many risk management tools within the private sector, including crop insurance and various marketing strategies, have expanded their usefulness to producers. Coverage options for crop insurance have increased. Other strategies, such as irrigation, land leasing, and use of custom operations also reduce the operator's risk. Spreading product sales over the year, followed by contracting the sale of production, continue to be widely used techniques.

New and often complex risk management tools -- federally subsidized revenue insurance, futures derivatives, and hybrid cash contracts -- are being added to the portfolio of alternatives available to agricultural producers. Crop revenue

coverage, income protection, and revenue assurance are being offered on a pilot basis.

The FAIR Act renewed interest in the agricultural risk environment and in alternate ways to mitigate risk. The amount of attention focused on the risk dimensions of farm and ranch management decisions today reflects the demand for information and educational assistance in this area: this is indeed a teachable moment.

The increasing number of alternatives for managing income risk leads us to questions about their effectiveness and how they can best be combined to meet specific commodity or geographic needs. Examples have shown that combining crop insurance and forward contracting can, when properly used, reduce risk over the growing season substantially. Revenue insurance can be effective in reducing revenue risk. But, alone or in combination, the tools must be carefully chosen and tested to meet individual producers' needs.

We need to address risk management within the context of total firm management The new Cooperative State Research, Education, and Extension Service and Land Grant University System initiative called Managing Change in Agriculture focuses on risk management and marketing as one of three priority program areas. Ongoing and envisioned programs will help producers develop and implement business procedures to anticipate and manage risks inherent in their environment and take advantage of marketing opportunities. The purpose is to assist decision makers in developing production, marketing, and financial risk management skills, and to use them to choose alternatives and develop strategies for their business and marketing plans.

What is our context for engaging in risk analysis and risk education? Clearly, risk management is not the end goal; our objective is not to help people reduce or eliminate risk. Remember that profits are a return to risk taking. But risk management needs to fit within the broader context of how people establish personal and family goals and the complex alternatives they must evaluate as they seek to accomplish those goals.

What will we see from this expanded risk management efforts? I predict a more competitive agricultural sector able to manage variability in yield, price, policy,

regulations, legal, human, financial, health and other factors that represent risks to the agricultural sector. I also see new successful working relationships that will better meet the research and education needs of U.S. agriculture and the public.

It is clear that the time is here for risk management. I am encouraged by your presence at today's session. Together, we can prepare and implement effective risk management programs grounded in the solid research, sound policy, and the development of appropriate and useful tools and strategies. We can help equip and fortify American farmers and ranchers and their families to face with agility and strength the formidable challenge of change in contemporary agriculture.

ALTERNATIVES FOR PRODUCER RISK MANAGEMENT

by

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Market and price volatility have long been a hallmark of the agricultural sector. When aggregate output or demand changes sharply, farm-level prices can fluctuate wildly. U.S. agricultural policies for major field crops have attempted to mitigate the risks farmers face from variations in crop yields and prices, and to help farmers manage these risks.

The form those policies have taken has, however, changed dramatically over time. The 1996 Farm Act has altered the government's role in providing support to producers, and has renewed interest in the agricultural risk environment and alternative ways to mitigate risk. Meanwhile, relatively new risk management tools--federally subsidized revenue insurance, yield futures and options, and hybrid cash contracts--add to the alternatives available to producers.

These developments raise several questions: How has the risk environment faced by producers changed over time, particularly with passage of the 1996 Farm Act? What are some of the new risk management tools available to producers? How effective are they in reducing farm-level income risk? This paper examines these questions, focusing on the risk environment faced by producers of major grain crops.

What Does the New Environment Mean for Income Risk?

The 1996 Farm Act dismantled the complex system of deficiency payments and annual supply management programs that were in place since 1973, affecting expected returns and the income risk confronted by grain producers. The "old" system provided program crop producers with price and income support in years of low market prices. In contrast, participating producers under the 1996 Act will receive "contract payments" that are fixed in the aggregate for each of the years 1996-2002, and that are at relatively high levels when compared to projected payments had the deficiency payment system been continued. Because contract payments do not increase when prices are low--a major feature of previous commodity programs--they do not, however, directly reduce farmers' income risks.

Under the pre-1996 program, payments were made during times of low market prices. That system not only raised farmers' incomes on average, but also provided a degree of protection against low incomes. Research conducted by USDA's Economic Research Service (ERS) and Ohio State University, based on conditions and program parameters in effect in 1992 and accounting for a wide range of weather shocks, indicates that simulated market returns for U.S. corn producers averaged about $270 per acre. Deficiency payments would add $50 per acre, on average, in income support.

In addition, deficiency payments tended to stabilize revenues by transferring income to producers when national average market prices were low. According to these research results, deficiency payments reduced relative revenue risk by an average of 20 percent for U.S. corn producers. Because deficiency payments were made when national average prices for program crops were low--and not necessarily when the revenue for an individual farm was low--this system was far from totally effective. In fact, year-to-year revenue risk was not dampened significantly for certain individual farms, and not at all in other cases--particularly for those farms in areas where yields and prices exhibit a strong inverse relationship, creating a "natural hedge" that works to stabilize revenues through market forces.

In contrast to the risk effects associated with deficiency payments, the new contract payments do not reduce relative revenue variability for producers. This is because they are not based on current prices or yields. In 1998, for example, a participating corn producer is projected to receive a contract payment averaging to about $32 per acre, regardless of actual price levels in that year. As a result, the revenue variability faced by producers who receive contract payments is essentially identical to the variability they confront if they depend only on market returns.

Although contract payments do not provide direct protection against risk, it is important to note that they offer substantial income support. Contract payments over the 1996-2002 are projected to be significantly higher than payments had the deficiency payment program been continued, totaling to more than $35 billion over the seven years.

....And For Price Risk?

It remains unclear whether and by how much price variability will change. Under the 1996 Act, output and price depend entirely on the market--USDA will no longer implement acreage reduction and other supply management programs. The net effect on price variability remains unclear, and depends on many factors.

For example, the aggregate effect of the increased planting flexibility associated with the 1996 Farm Act on the volatility of crop prices is uncertain. Before 1996, participating producers' planting decisions were limited by base acreage constraints, acreage reduction programs (ARPs), and other provisions. With the 1996 Act, however, farmers now have nearly total freedom to

plant a wide variety of crops on any of their land, and ARPs have been eliminated. As a result, planting decisions are affected by the expected prices and yields that farmers envision at planting time, relative costs, rotational concerns, management abilities, available equipment, and weather conditions at planting time.

The effect of this increased planting flexibility on the volatility of crop prices (and hence farm revenues) depends on producer behavior and aggregate supply response. If year-to-year planting adjustments are significantly greater than in the past, prices and revenues may be more volatile. On the other hand, volatility may be reduced if farmers can more readily respond to market signals, without the planting restrictions that may have constrained acreage shifts in the past.

Changes introduced with the 1996 Farm Act are part of an evolution to more market-oriented policies that began with the 1985 Farm Act, and many program changes that have occurred over time have implications for variability. During the early 1980's, government loan rates (the price per unit for commodity loans to participating farmers) were set at high levels, establishing a floor under market prices and encouraging forfeiture of crops into government stocks in lieu of loan repayment. The 1985 Act reduced loan rates, increasing the role of marketplace signals and reducing government intervention and stockholding. The 1996 Farm Act capped commodity loan rates at 1995 levels and marketing loan provisions are in place--both of which reduce the likelihood that loan rates will interfere with market prices.

Other developments have also affected the risk environment, particularly the tightening of world grain stocks. This situation is the result of rising demand outpacing production, as well as policies in the U.S. and elsewhere aimed at reducing government-held stocks. The global stocks-to-use levels for corn and wheat in 1995/96 fell to the lowest level in the USDA data base that starts in 1960. If low global stock levels persist, prices (and revenues) will likely be more volatile than if higher stocks were available to buffer year-to-year supply and demand shocks.

Some changes in the risk environment may be partially offsetting. Reduction in trade barriers, including passage of the Uruguay Round Agreement and the North American Free Trade Agreement, has enhanced world market integration and agricultural trade potential. The ability to ship more goods from areas of commodity surplus to deficit regions may work to dampen market volatility and reduce price variability in future years.

In short, substantial uncertainty remains regarding the price risks faced by producers. However, with the absence of downside price protection provided by deficiency payments--and the current system of fixed, declining contract payments--revenue variability will likely increase. And, of course, any increases or decreases in price variability--an empirical question to be measured over time--will have implications for the variability in farm-level revenues as well.

Farmers Use a Variety of Tools

Within the changing risk environment, many traditional risk management tools continue to be useful to farmers, including crop insurance and various production and marketing strategies. Certainly, income risk is nothing new to farmers, and many have used a wide variety of tools--including Government programs, diversification, and various forward sales strategies--for some time.

Federal crop insurance, for example, which underwent extensive reform in 1994, has been available to producers of program crops (and various specialty crops) since at least 1980, and for some crops and areas as early as 1938. At the catastrophic level (CAT), producers pay a $50-per-crop fee for coverage against yield losses of greater than 50 percent of the farm's expected yield. CAT can be purchased through private insurance companies and, in some locations, through Farm Service Agency offices. Producers can increase coverage up to 75 percent of their expected yield by paying a premium. This additional coverage is available only through private companies. USDA subsidizes Federal crop insurance policies and reinsures (shares the losses and gains) with the company writing the policy to the producer.

USDA's 1993 Farm Costs and Returns Survey (FCRS) included several questions that probed farmers' use of alternative risk strategies. Two categories were used to summarize farmers' responses: production strategies (such as Government programs, crop insurance, and diversification), and marketing strategies (such as forward contracting, hedging, and spreading sales throughout the year).

According to the results, more than half of the farmers surveyed used government programs and about 25 percent used crop insurance in 1993 (Figure 1). The survey found that the use of government programs and crop insurance was especially important for operators of cash grain farms in the Northern Plains and the western Corn Belt. Other strategies such as leasing land and using custom labor were more likely to be chosen by farmers in the Southeast and in the West. These latter strategies are risk-reducing because they allow producers to expand their operations without taking on an added mortgage or fixed equipment costs. In general, large farms appear to use diversification, leased land and equipment, and the contracting of inputs more commonly than do smaller farms.

The survey indicated that the most popular marketing strategy among U.S. farmers in 1993 was spreading sales over the year, followed by contracting the sale of farm production (Figure 2). The latter technique establishes a pre-harvest selling price and guarantees an outlet for the commodity. A less popular strategy was hedging, a process whereby the farmer uses the futures market to establish a pre-harvest price for his or her crop. To successfully implement a hedging strategy, cash or credit is required to begin and maintain the hedging process, which may limit its use.

Large farm operators are most likely to use marketing strategies to manage their risks, and farmers in the Northern Plains are much more likely to use such strategies than those in the Southeast. Farmers in the Northern Plains typically have less diversified operations than those in the Southeast, which may explain this geographic pattern. Also, farms in the Northern Plains tend to be larger, as measured by sales volume, than those in the Southeast.

New Products Help Farmers Manage Risks

In the spring of 1996, two pilot revenue insurance programs were introduced to complement the traditional risk management tools discussed above. Income Protection (IP) was developed by USDA's Risk Management Agency in response to a mandate in the Federal Crop Insurance Reform Act of 1994, while Crop Revenue Coverage (CRC) was designed by a private insurance company. These programs have expanded to new geographic areas over the past year, and a new product--Revenue Assurance (RA)--will be offered in the spring of 1997 in selected areas and for selected crops. Each product is based on the concept of combining price and yield risk protection in one program that provides downside revenue risk protection to producers.

IP offers a "revenue guarantee" based on the total acreage planted by a producer, the sign-up time futures price for harvest-time delivery, and the farmer's expected yield. The farmer receives an indemnity if the harvest-time price, multiplied by the farm's actual yield in that year, falls below the guarantee. Because the guarantee is based on the early-season price projection for harvest-time, IP protects against shortfalls in actual revenue below the expected revenue for the particular season. This policy, similar to CRC and RA, also provides a measure of inter-year stability because sign-up time futures prices for harvest-time delivery are less variable than harvest-time prices. IP premium costs are lower than for traditional crop insurance, especially in areas with high yield-price correlation.

CRC contains two components. The first, similar to IP, offers a revenue guarantee based on price expectations and farmers' expected yields. The second component offers "replacement coverage," whereby coverage can increase during the season if prices rise. If a producer has a short crop and the price is higher at harvest than the pre-harvest projection, the producer's crop yield loss is indemnified at the higher harvest-time price, allowing him or her to buy "replacement" bushels in the marketplace. The producer receives the higher of the "revenue guarantee indemnity" or the "replacement coverage" indemnity. Because of the added costs of replacement coverage, as well as other features, CRC premiums are much higher, on average, than IP premiums.

Revenue Assurance contains only one component--the revenue guarantee--making it more similar to IP than to CRC. However, RA and IP differ in important ways. RA embeds a unique system of premium discounts that depend on the unit structure associated with the farm. In contrast, IP allows producers to insure at only the enterprise unit level (all acreage in a crop in a

county is combined into one parcel), while CRC provides for both basic and optional acreage division.

As with Federal crop insurance, USDA subsidizes and reinsures revenue insurance policies that are approved by the Federal Crop Insurance Corporation Board of Directors. Premiums vary by the coverage level selected (options range up to 75 percent yield coverage), and policies are then sold to producers by private companies. The geographic areas eligible for coverage have expanded considerably over the past year:

- *Income Protection*--IP was offered for corn, cotton, and spring wheat in 29 counties in the spring of 1996, and for winter wheat in 18 counties in the fall of 1996. For the spring of 1997, the FCIC Board approved IP expansion into soybeans (56 counties) and grain sorghum (24 counties).

- *Crop Revenue Coverage*--CRC was offered for corn and soybeans in all Iowa and Nebraska counties in the spring of 1996, as well as for winter wheat in six states (and selected counties in Montana) in the fall of 1996. Beginning in the spring of 1997, CRC is available for cotton, grain sorghum, and spring wheat in selected counties, and geographical coverage for corn and soybeans has been expanded significantly.

- *Revenue Assurance*--RA policies were approved for sale for corn and soybeans in all counties in Iowa for 1997. This is the first offering of the RA product.

Experience data show considerable variation in participation rates depending on the crop and the area. About 90,000 CRC policies were sold in Iowa and Nebraska in 1996, and about one-third of the Federally-subsidized crop insurance policies in those states were CRC policies. CRC covered about one-third of all corn and soybean planted acreage in the two states, and the liability for CRC and MPCI sales were nearly identical (Table 1).

In contrast, about 10 percent of all Federally subsidized winter wheat policies in states where CRC was available were CRC sales--a substantial drop compared to spring-crop experience (Table 2). Some argue that lower winter wheat sales were due to the relative premium rate increase on CRC winter wheat policies when compared to corn and soybeans. Some observers also indicate that corn and soybean producers may have been in a better financial position in 1996 to pay the CRC premium than were winter wheat producers. The impact of lower commodity prices in 1997 on CRC sales remains to be seen.

In addition to these revenue insurance products, new forward contracting arrangements have also developed. Farmers have long been able to lock in a price for a given quantity well ahead of harvest by forward contracting with a local elevator. New types of contracts provide farmers with greater flexibility in managing risks, but some, particularly hedge-to-arrive contracts, are

often difficult to understand, and have led in some cases to legal disputes between farmers and buyers.

In addition, the Chicago Board of Trade has introduced yield futures contracts for selected states and crops. When combined with price futures (or options), the yield contract can substantially reduce revenue risk in many areas. Farms and businesses--including grain companies and insurance companies--have expressed an interest in these contracts, but trading volume has been low. Basis risk (uncertainty about the difference between a farm's yield and the state yield on which the contract trades) is a major obstacle to direct hedging in yield futures by farmers.

How Effective Are Various Risk Management Tools?

The many options available for managing income risk lead to questions about their effectiveness and about how they can best be combined, and particularly, their relative effectiveness in different regions. To address these questions, ERS examined four risk management strategies--forward selling a portion of expected output (for example, through a futures hedge); purchasing crop insurance at the 75-percent coverage level; combining crop insurance and a forward sale; and purchasing revenue insurance at the 75-percent coverage level (based on the harvest-time futures price). Although there are many ways in which risk can be measured, the approach used here assumes a "safety first" criteria, where risk is measured as the probability of revenue falling below 70 percent of expected revenue.

In making the comparisons, we focused on risk and did not estimate the effects of the different strategies on average revenues. Forward selling generally has little effect on average revenues, but with government subsidies, crop and revenue insurance increase average revenues for most farmers. Subsidization provides an additional incentive for farmers to insure.

The effects of the four strategies were compared with the use of a "no risk-reducing strategy" for representative corn producing locations in Illinois, Iowa, North Carolina, and South Dakota. This strategy assumes that producers sell their crops at harvest for the local cash prices. As seen below, the effectiveness of the various risk-managing strategies varies by location. These differences stem largely from differences in yield variability, yield-price correlation, and basis variability between the locations.

The results indicate that a representative corn producer in Iowa or Illinois who does not sell forward or buy crop insurance would expect, on average, that his or her revenue would be less than 70 percent of preplanting expectations about 8-11 percent of the time (Figure 3). In contrast, the probability of such a low revenue is much higher in North Carolina or South Dakota--about 20-25 percent of the time. This is because yields are more variable in North Carolina and South Dakota than in the central Corn Belt. Moreover, the negative relationship between yield and price--called the "natural hedge"--is relatively weak in North Carolina.

The natural hedge is an important concept in analyzing risk. For example, in the major producing areas of the Corn Belt, the widespread occurrence of low corn yields can cause prices to increase significantly. Conversely, low prices are often associated with bumper-crop years. This "offsetting" relationship between prices and yields tends to stabilize farm revenues over time in these areas. Yield and price variations are less likely to offset each other in their effects on revenue where the natural hedge is weak. In states such as North Carolina, low corn prices and low yields (or high prices and high yields) are more likely to occur at the same time than in the Corn Belt, making corn revenues inherently more variable. This is because these areas have less impact than the Corn Belt on national output and prices.

Forward selling part of the expected crop prior to harvest reduces risk modestly compared with the "no strategy" case, although the impact varies considerably across locations. When the optimal amount is sold forward, the probability of revenue amounting to less than 70 percent of expected levels declines to 6-8 percent in the central Corn Belt and to 15-20 percent in North Carolina and South Dakota. Forward selling reduces revenue risk substantially in North Carolina, where the natural hedge is relatively weak.

Forward selling--either through hedging, buying a put option, or forward contracting with a local elevator--results in similar risk reduction. Each method has pros and cons depending on the farmer's situation and risk preferences.

Futures hedging ensures a highly competitive price, but requires access to credit if prices rise before harvest. Buying put options gives farmers the right (but not the obligation) to sell a futures contract at a specific price. Put options provide protection against price declines, without completely eliminating opportunities to gain from price increases, but there is a premium cost. Cash forward contracting with a local buyer is the simplest for many farmers and assures a physical outlet, but offers less flexibility and may not result in the highest price.

Used alone, crop insurance tends to be more effective than forward pricing in reducing revenue variability. The effect is the greatest in South Dakota, where yields are more variable than in the other three states in the ERS study. Whether crop insurance or forward selling is more effective by itself depends on the relative variability of yields, and on the fact that crop insurance has been offered with a maximum of 75 percent coverage. Coverage higher than 75 percent would be more effective in reducing risk, particularly in the Corn Belt, but also could raise Federal costs by increasing farmers' temptations to reduce inputs once yields are guaranteed.

When a producer combines a forward sale with the purchase of crop insurance, the probability of low revenue is reduced dramatically for each of the locations, compared with the no-strategy case. The two strategies complement each other strongly, particularly where the natural hedge is strong. Probabilities of revenues below 70 percent of expectations are reduced significantly in every case, and reduced to nearly zero in Illinois and Iowa.

The greatest risk reduction among the alternatives examined is provided by 75-percent-coverage revenue insurance. (The revenue insurance plan assumed here is an intra-seasonal guarantee based on individual farm yields and futures price projections, and does not include a replacement coverage component--only a basic revenue guarantee. Thus, it is more similar to IP or RA than to CRC.) Such coverage reduces the probability of revenues less than 70 percent of expectations to zero, except for risk associated with differences between local prices and futures prices at harvest-time (i.e., basis risk).

These examples show that probabilities of revenues falling below 70 percent of signup time expectations can be reduced substantially by combining forward pricing and crop insurance. Direct revenue insurance can be even more effective in reducing probabilities of such low revenues. Moreover, the consistent use of these strategies in successive years can be expected to reduce year-to-year variability in revenues because signup time yield and price expectations are less variable than the yields and prices realized at harvest. This year-to-year stabilization effect is not quantified here.

But farmers face longer term revenue risks when prices differ from historical levels for more than a year. Dealing with these longer term risks calls for other types of strategies, such as holding reserve funds, diversification among enterprises, adopting risk-lowering technologies (such as shorter season crop varieties or supplemental irrigation), and acquiring off-farm sources of income. As indicated by the FCRS data, many producers are using a combination of such tools and strategies. However, many issues remain regarding risk management, particularly over the long run.

Issues for the Future

Can farmers use existing tools more effectively? The effectiveness of different risk management strategies can vary widely across different geographic regions. Additional research is needed to determine what types of currently available tools and strategies are most useful to producers across the various regions, as well as to investigate new types of safety nets. And certainly, risk management education is increasingly important to help producers better understand how to most effectively use available strategies. Important issues for the future include:

- How do farmers spread risk over time? The FCRS data provide a "snapshot" for each year, but do not track producers over time. Tracking longer term behavior could be helpful in developing new products and making recommendations on inter-year strategies for different geographic locations and situations.

- Can (and should) government programs be designed to protect against inter-year revenue risk? Undoubtedly, the U.S. will experience, at some point, a sequence of years when farm-level revenues are low. Ideas for inter-year risk protection include a "target" revenue insurance program that stabilizes inter-year revenues,

or an income stabilization account approach that subsidizes producer savings to be drawn upon in years when revenues are low.

- What are the possibilities for private tools and institutional arrangements? Ideas for new private tools include longer term forward contracts, while public-private arrangements could include innovations to the current crop insurance program or the revenue insurance pilots. These programs are public-private arrangements in the sense that they are delivered (and designed in some cases) by private companies, with the government subsidizing the products (once approved) and sharing in the risk of loss.

As farm sizes become larger, some farmers may be in a better position to self-insure through the use of on-farm savings, along with use of risk management strategies. However, risk protection will remain an important issue well into the next century for farm households depending primarily on farm income, especially mid-sized commercial farms.

Risk management in farming calls for a variety of tools that, as a whole, reduce year-to-year revenue variability over the long run. Insights into the questions--and issues--discussed above may help producers better understand and cope with risks, and help policymakers and the private sector create improved safety nets for producers.

Table 1

A Comparison of Crop Insurance and Crop Revenue Coverage Acreage and Liability

1996 Corn and Soybeans in Iowa and Nebraska

	Net Insured Acres (Million acres)		Liability (Billion dollars)	
Crop	MPCI [1]	CRC [2]	MPCI	CRC
Corn	10.3	7.4	$1.7	$1.8
Soybeans	6.8	3.3	$0.9	$0.6
Two-state, two-crop total	17.1	10.7	$2.6	$2.4

[1] Multi-peril crop insurance.

[2] Crop Revenue Coverage.

Table 2

A Comparison of Crop Insurance and Crop Revenue Coverage Policy Sales for Winter Wheat, 1997 Crop

(Data are preliminary, and reflect number of policies)

State	MPCI [1]	CRC [2]	Total [3]	Percent CRC
Kansas	63,526	7,982	71,550	11.2
Michigan	3,215	626	3,841	16.3
Montana [4]	7,699	128	7,827	1.6
Nebraska	18,239	3,133	21,372	14.7
South Dakota	12,351	222	12,573	1.8
Texas	16,940	2,294	19,234	11.9
Washington	4,917	139	5,056	2.7
Total	126,887	14,524	141,453	10.3

[1] Multi-peril crop insurance.

[2] Crop Revenue Coverage.

[3] Total includes a small number of Income Protection and Group Risk Plan sales.

[4] Not all Montana counties were eligible for CRC coverage.

Figure 1
Producers' Production Strategies for Managing Risk Vary by Economic Size

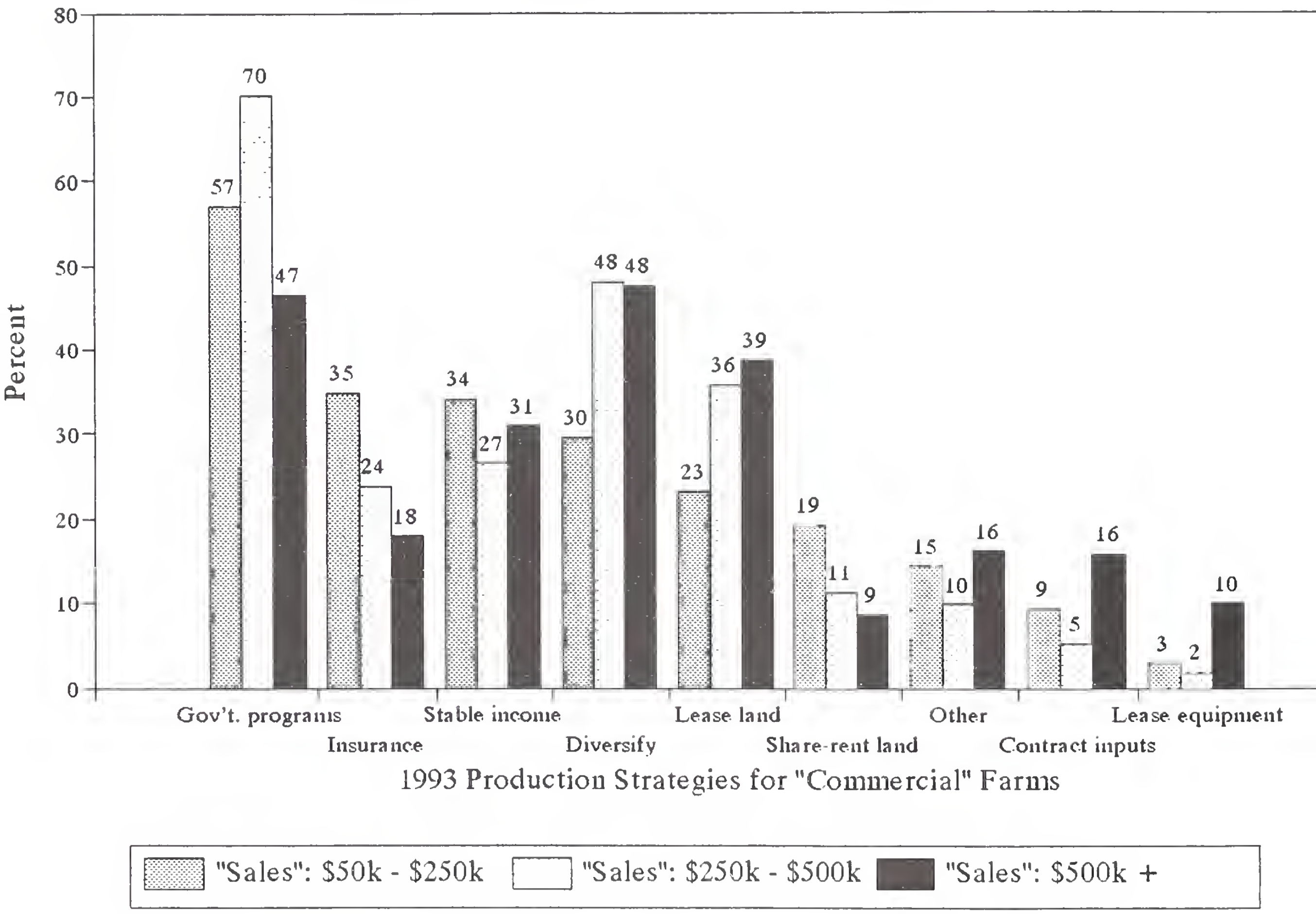


Figure 2
Producers' Marketing Strategies for Managing Risk Vary by Economic Size

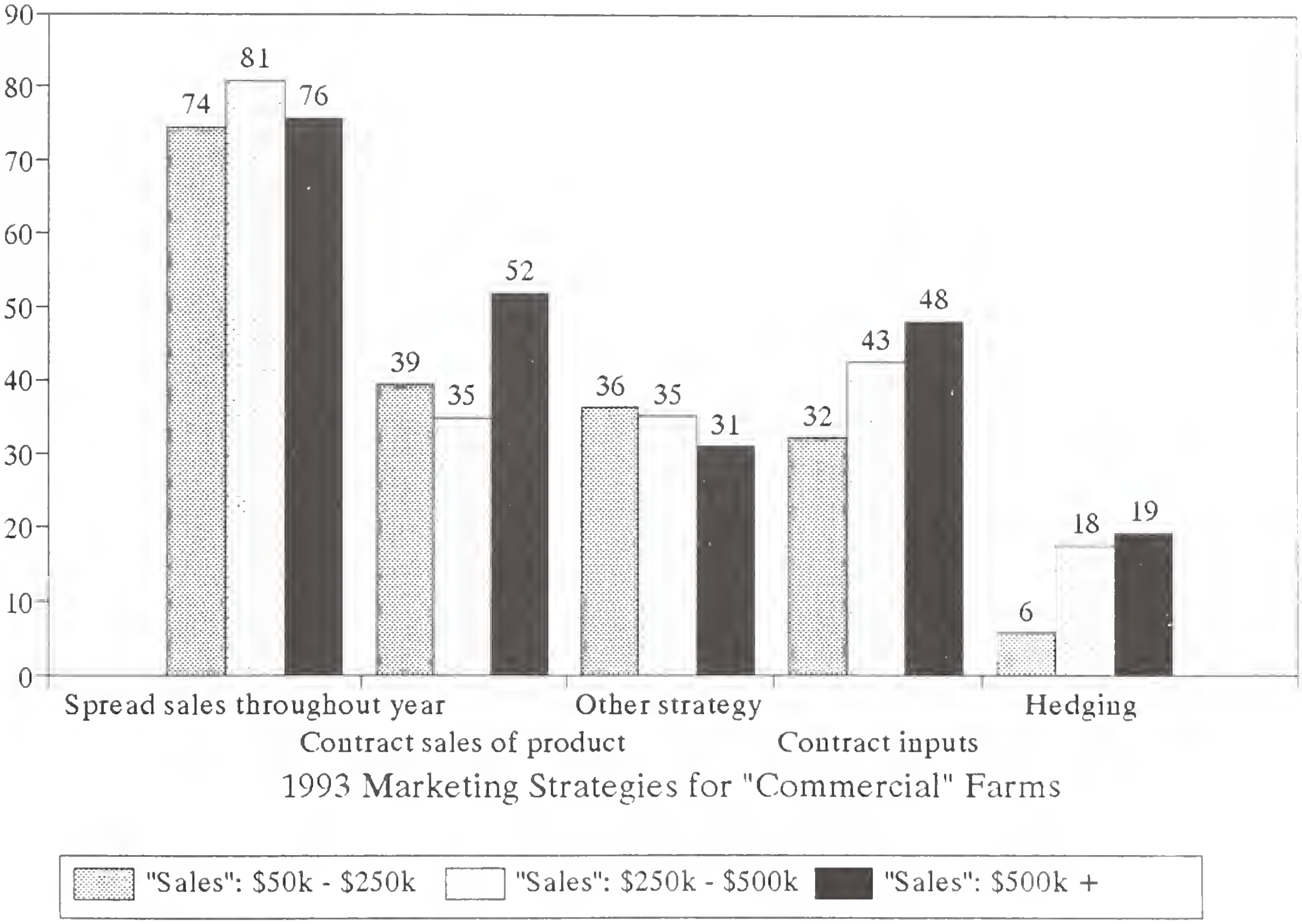
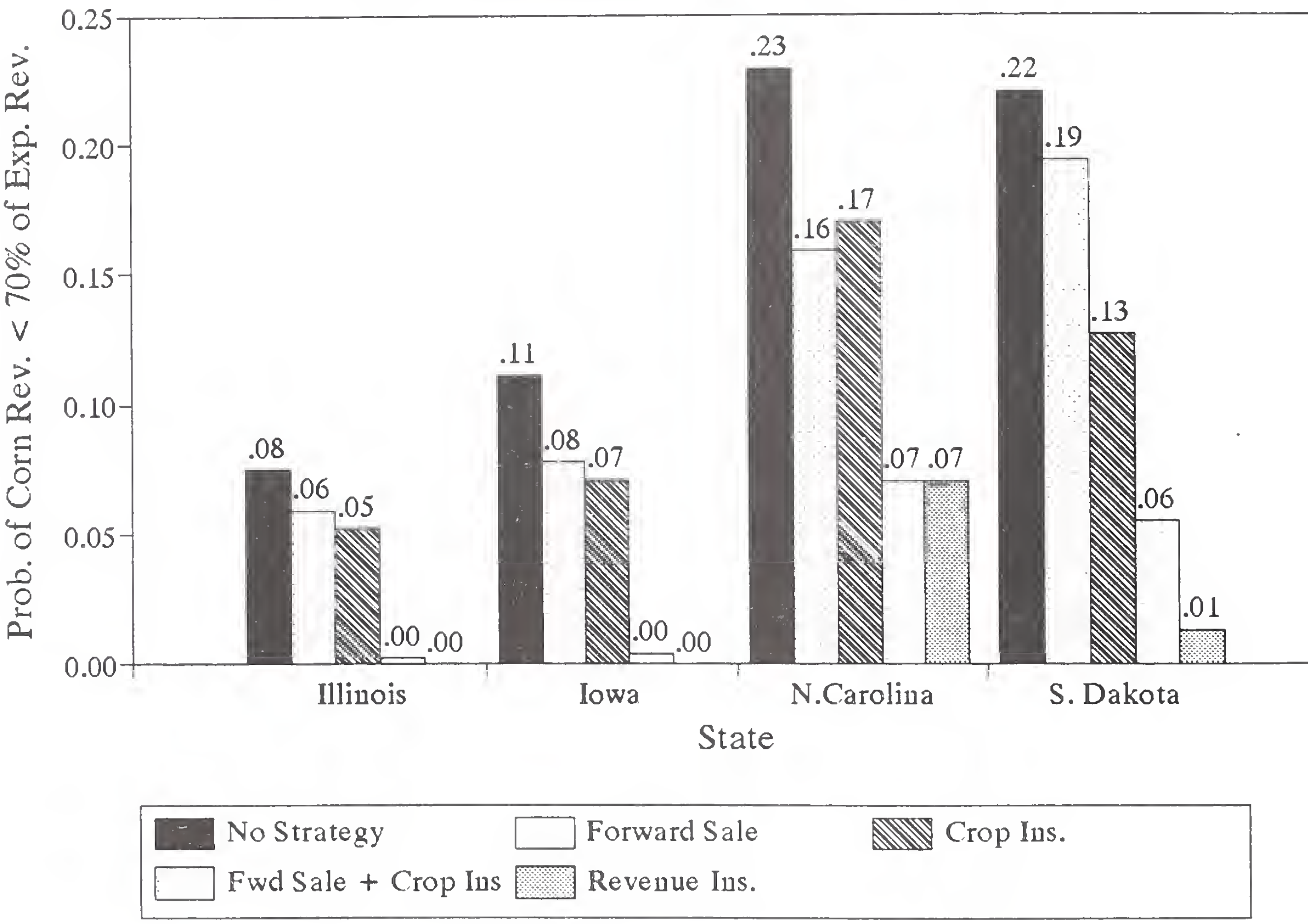


Figure 3
Risk Management Strategies Reduce the Probability of Low Revenues for Corn Producers



"NEW AGRICULTURAL RISK MANAGEMENT INSURANCE TOOLS"

Ken Ackerman
Acting Administrator, Risk Management Agency

The last three years represent a period of radical change for U.S. producers. Besides the normal factors of weather and markets, a major reason for this most recent period of change has been the Federal Government's movement toward a balanced budget. Several public policy changes have altered the Government's role in providing support for agriculture producers in managing risk. A key result of these efforts by the Administration and Congress has been to elevate Federal Crop Insurance into perhaps the principal pillar of the remaining Federal "safety net" for the American farmer.

Two key pieces of legislation have had the biggest input in making this "safety net" transition. The first was the Federal Crop Insurance Reform Act of 1994 (1994 Act) which eliminated ad hoc disaster payments and replaced them with an expanded and enhanced crop insurance program. Second was the Federal Agricultural Improvement and Reform Act of 1996 (1996 Act), which eliminated deficiency payments and lowered funding for other price support programs.

The impact of these legislative changes has been enormous on the RMA. In 1994, FCIC serviced 800,263 policies nationwide. In 1996 the number of policies rose to 2,254,599. In 1994 the total premium written was $949,450,301. In 1996 the premium volume was $1,815,287,210. In 1994 the total Federal crop insurance book of business represented $13,606,300,646 in liability. In 1996 the liability was $26,474,880,614.

U.S. farmers and ranchers in 1997 are planning and planting their second crop in this "New Risk Environment." Our farmers and ranchers must now change their management style from passive to active. Active management requires farmers and ranchers to do more analysis about which crops and how much of each to produce. The management challenge of the future is to balance risk with returns. Producers must now weigh the benefits and costs of various strategies and decide which are best for their operation and personality.

Farmers face a multitude of risks in the commodity production environment. However, Federal programs have traditionally aimed at having an impact in the three major types:

1) yield
2) price/marketing, and

3) financial.

The RMA is responding to new risk management needs in three principal ways: 1) by broadening existing programs, 2) by expanding current crop insurance models, and 3) by expanding services through such new initiatives as risk management education.

1) BROADENING EXISTING PROGRAMS TO UNINSURED CROPS.

Today, FCIC offers insurance on 61 different crops, representing over 75%of the value of national crop production. This excludes several hundred crops covered by the Non-insured Assistance Program (NAP). NAP is a low- level yield protection program which becomes available when a crop has sustained a loss of greater than 35% in an area. NAP is currently administered by Farm Service Agency. Over the next several years, a key goals will be to bring a large number of the NAP crops under the Federal crop insurance umbrella. Bringing these crops on line requires an analysis of their production history and underwriting profile in order to set actuarially sound rates. It is important not only that we expand the insurance program, but that we do it carefully and consistently with our standards for financial integrity.

As part of this process RMA in 1988 plans to offer the following new coverages:

- C Expansion of the Group Risk Plan for wheat and forage
- C Almond revenue pilot program
- C Sweet potato pilot program

In 1999 RMA plans to expand further:

- C Aquaculture pilot program
- C Cherries pilot program
- C Christmas tree pilot program
- C Direct marketed vegetable pilot program
- C New nursery program
- C Peach revenue pilot program
- C Pecan pilot program
- C Turfgrass sod pilot program
- C Wild rice pilot program

2) EXPANDING PORTFOLIO OF CROP INSURANCE MODELS.

The traditional Federal crop insurance coverage offered by RMA provides individualized yield coverage for producers. The 1994 Act authorized RMA extend crop insurance coverage beyond its historic bounds. The legislation mandated a basic coverage for producers of insurable crops and permitted RMA to explore other coverages. RMA has responded to this legislative authority

with the introduction of several new insurance products. So far, among other things, the result has been the introduction of Catastrophic coverage and three new revenue crop insurance products.

Catastrophic Coverage (CAT):

The Federal Crop Insurance Act of 1994 created a CAT level of crop insurance. The goal was to make crop insurance inexpensive and accessible to as many farmers as possible as a trade off to the elimination of ad hoc disaster aid. CAT coverage is provided to farmers for no premium charge. However, producers must pay a $50 administrative fee for each crop and county insured. Producers will never pay more than the limit of $200 per county or $600 for a single producer for all crops and counties insured.

The amount of protection provided by CAT coverage is 50 percent of the producers historic yield insured at 60 percent of the FCIC indemnity price. For most producers, this is approximately equal to traditional ad hoc disaster payments.

CAT coverage is available for all insurable crops grown in the U.S. It may be purchased from an approved insurance provider and, in some states, from Farm Service Agency local offices.

Revenue Insurance

Both the Federal Crop Insurance Reform Act of 1994 and the 1996 Act directed FCIC to develop a pilot crop insurance program that provides coverage against reduced gross income as a result of a reduction in yield or price, or revenue insurance.

Currently, RMA is experimenting with three forms of revenue insurance that extend the coverage to include fluctuations in price. Each product employs a concept of combining yield and price risk protection into one crop insurance program to insure revenue.

Income Protection (IP).

The Income Protection (IP) pilot program was developed by FCIC and introduced in 1996. IP is designed to insure the producer against reductions in gross income from insurable reductions in yield or price. IP appeals to producers who seek a guaranteed minimum level of revenue at harvest time. Yield setting, loss adjustment, and underwriting are based on the FCIC procedure for traditional multiple peril crop insurance (MPCI).

Guarantees are calculated using the producer's historic average yield multiplied by the "projected" price, multiplied by the coverage level selected by the producer. Available coverage level choices begin at 50 percent up to 75 percent in 5 percent increments.

Indemnities are due when any combination of yield and "harvest" price is below the guarantee. IP prices are an average of the daily closing price for the commodity futures contract designated in the IP policy. For example: the IP prices for Illinois corn are calculated using the Chicago Board of Trade December corn futures contract. The "projected" price is the February daily closing price average of the Chicago Board of Trade December corn futures contact. The "harvest" price is the November average of the December CBOT contract.

Premium rates for IP are developed from a rating model that measures the covariance of individual yield and prices designated in the policy. For crops in areas where there is an inverse relationship of yield and price, the rates are low. The opposite is true where there is no price and yield relationship. Therefore, IP premium rates tend to be different from the traditional multiple peril crop insurance.

For the 1996 crop year, the IP pilot was available for corn, cotton, and spring wheat in a total of 30 counties.

For 1996, about 998 IP policies were purchased, covering about 218,000 net acres, with total premiums of about $3.4 million (see the attached table). About 33 percent of IP insured acreage and 22 percent of IP premiums in 1996 were corn; about 9 percent of acreage and 38 percent of premiums were for cotton, and about 58 percent of acreage and 40 percent of premiums were for spring wheat.

For the 1997 crop year, the IP pilot program was expanded to be available for corn, cotton, grain sorghum, soybeans, spring wheat, and winter wheat in a total of 129 counties.

The pilot program will operate through the 2000 crop year.

<u>Crop Revenue Coverage (CRC)</u>:

CRC is a revenue product developed by Redland Insurance Company and reinsured by FCIC. It was first offered in 1996 for corn and soybeans in Iowa and Nebraska. For 1997, CRC has been expanded to include cotton, grain sorghum, and wheat and has been made available in several more States and Counties. In addition to providing a revenue floor when prices decline, CRC also allows for recomputation of the revenue guarantee at harvest time to adjust for increasing price changes in the futures market. The allowance for the change in projected price from the beginning of the insurance period to the price at the end, is the primary difference in CRC and other current revenue insurance plans. The CRC also provides for unit coverage similar to the underlying MPCI policy.

CRC may pay an indemnity when any combination of yield and harvest commodity price is below the guarantee. The additional coverage component applies when two events occur: 1) the actual yield is below the guaranteed bushels and the harvest price is above the "projected" price.

The indemnity is the bushel shortfall multiplied by the harvest price. This type of coverage is also referred to as replacement coverage because the lost bushels are indemnified or replaced at the harvest price.

The premium rates for CRC are based on the MPCI policy rate plus a low revenue factor plus a high price factor. The addition of these factors is the reason that CRC coverage is more expensive than MPCI products.

CRC appeals to producers who desire a guaranteed minimum level of revenue protection and coverage for aggressive marketing commitments. The producer managing price risk could market up to 75 percent of their guaranteed production before the crop is harvested. For example, in 1996 a CRC insured could contract for the July seasonal high with the assurance that at harvest time they would have the bushels or the money to liquidate the contract.

For Iowa and Nebraska corn and soybeans in the 1996 crop year, farmers purchased about 80,000 CRC policies covering about 10,738,000 net acres with total premiums of about $134 million. For the 1997 crop year, the data is still incomplete.

Revenue Assurance (RA)

RA is new concept developed by Iowa Farm Bureau and reinsured by FCIC. Iowa corn and soybean producers will be able to select this coverage beginning with the 1997 crop year.

RA shares many of the same features as IP but has some unique differences. For instance, under RA, commodity prices are adjusted to a county level price and the producer's premium will vary by the method they choose to identify insurance units.

Pricing RA by the unit division allows producers to better manage risk. The producer who is interested only in farm totals and the lowest possible premium cost can choose the whole farm corn and soybean unit. At the other extreme, the producer who is concerned about losses on the smallest possible acreage can elect that coverage and pay additional premium.

Revenue product summary:

All crop insurance products have important risk management features. In the prior decade, we promoted crop insurance as loan collateral and family security. Producers selecting the new revenue based products in the "new risk environment" can also give themselves a firm basis to aggressively market their crops during the growing season up to their amount of protection. Many have learned the value of crop insurance products to backstop their marketing plans.

The Presidents 1998 budget proposes legislation authorizing nationwide expansion of revenue insurance. So far, the revenue products have been limited to only certain States and crops. Still,

this new approach has been widely accepted by farmers who have had the opportunity to obtain it.

Other new models:

A: Options Pilot Program (OPP)

The OPP is currently being reviewed by RMA for future development. The concept is to use commodities futures and options as tools to protect producers from fluctuations in price, yield, and income, but at no additional cost to the Government "to the maximum extent practicable. Under FSA's stewardship from 1993 through 1995, the program provided participants with in-the-money options and incentive payments in return for their participation. Participants would voluntarily forego their FSA program payments in return. The results of these first three years' experience were inconclusive due to the impact of early exercise of the in-the-money instruments. The program was not activated for either the 1996 or 1997 crop years.

RMA has the benefit of the experience of the first attempt at an OPP as it reviews the program for possible re-implementation. RMA's version of the OPP will undoubtedly take a new approach that will draw on its own analysis and the Office of Inspector General's Audit Report on the first three years of the OPP. Further, RMA will accept proposals from outside sources on OPPs for specific commodities to add to pool of suggested alterations. Already, the National Dairy Foods Association and the National Milk Producers Federation have expressed the desire to explore the usefulness of an OPP to educate dairy producers in hedging stategies. In response, RMA is currently reviewing a fluid milk OPP proposal received from the Coffee, Sugar, Cocoa Exchange (CSCE).

The milk OPP proposal calls for implementation in six counties in each of six states and offers some very interesting innovations to improve upon the weaknesses in the former OPP. The use of out-of-money instruments combined with a limitation on their excercise prior to the contracts' becoming either "at" or "in"-the-money addresses the problem of early excercise that plagued the preceding OPP. In a sense, from an insurance perspective, the use of out-of-money instruments acts as a kind of deductible t the cntract holder, and less like a cash transfer than the use of in-the-money instruments.

The "jury is still out" on the feasibility of the OPP as a government sponsored program. However, RMA is encouraged that the opening-up of the process to outside proposals will provide a wealth of ideas that should eventually make the OPP, in its new form, a far more useful educational tool to the producer as well as more responsive to the fiscal concerns of the taxpayers.

B: Canadian Program:

Another intra-year income safety net is currently operating in Canada called the Net Income Stabilization Account (NISA). That concept could be adapted to U.S. agriculture. The basic concept is that in years of good income a producer could deposit part of their income in a tax deferred account. The deposits are then matched by the Government. In a year when income was low, or other triggering devises are met, they could draw a specified amount from their account. RMA is studying their program to determine its feasibility in the U.S.

3) EXPANDING SERVICES: Risk Management Education

RMA will play a key role in helping farmers become more knowledgeable about the decisions they face with more active risk management. During the transition, RMA will lead a Risk Management Education Initiative that provides farmers with objective and unbiased information to take advantage of opportunities and avoid pitfalls . This initiative represents a joint effort with CREES and CFTC, and will rely strongly on the involvement of private sector entities interested in educating farmers about risk management.

U.S. producers need new and improved risk management tools and the knowledge to use these tools correctly. Much work is being invested in learning how tools of the crop insurance industry, cash grain trade, and commodity futures industry can be used together in a risk management strategy. Risk management education will aid in this adaptation.

RMA is looking forward to the challenges which lay ahead. Producers must be provided the tools and knowledge to operate in this new risk environment. To this end, the Agency will broaden our existing program base, expand the portfolio of insurance models and coordinate needed educational opportunities for the US farmer. We are committed to working with other Federal Agencies and private sector enterprises to accomplish these goals.

THE USE OF DERIVATIVES IN A NEW ERA FOR AGRICULTURE[1]

Commissoner Joseph B. Dial
Commodity Futures Trading Commission

Introduction

To the best of my knowledge, this is the first time a Commissioner of the Commodity Futures Trading Commission (CFTC) has been a speaker at USDA's annual Agricultural Outlook Forum. I am honored to have the opportunity to participate in such a prestigious event.

In view of the fact that most people know little or nothing about the CFTC, I think it might be useful to give you a brief description of who we are and what we do. The CFTC was created by Congress in 1974 to serve as the independent federal regulator of all U.S. futures exchanges. Contrary to what some people think, and with all due respect, we are not a part of USDA. We presently regulate 11 exchanges that trade, on average, approximately two million futures contracts daily. The value of the underlying assets, upon which the futures are traded, oftentimes is in the trillions of dollars. We also have the responsibility to supervise the 64,000 persons and firms that make up the futures industry. Finally, the Commission maintains daily surveillance over the trading of some 200 different futures contracts. Additional information about the CFTC can be found on the Internet. Our website address is http://www.cftc.gov.

It may be of particular interest to this forum's audience to know that for 13 years the CFTC has worked closely with its Agricultural Advisory Committee (AAC). This group meets formally twice each year and deliberates the issues that affect agricultural futures markets and our regulation of those markets.

The AAC has 25 members, designated by organizations representing every major segment of the agricultural community in this country. As chairman of the committee, my office is in daily contact with one or more of the organizations that make up the AAC. In order to give you an idea of the types of important substantive work the AAC has been involved in, I would point to three relatively recent landmark events: the 1991 "Kalo A. Hineman Delivery Issues Symposium," the 1994 "Summit on Risk Management in American Agriculture," and the 1995 "Round Table Discussion on Agricultural Trade Options." If anyone would like more

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[1] *Please note: the views expressed herein are those of the author and do not necessarily reflect those of the Commodity Futures Trading Commission or its staff.

information about the CFTC Agricultural Advisory Committee, you can contact me by e-mail, my address is jdial@cftc.gov.

Derivatives

My topic today is, "The Use of Derivatives in a New Era for Agriculture." I recognize the term derivatives is not a household word, so a simple explanation is in order. Derivatives involve the trading of rights or obligations based on an underlying product, without necessarily directly transferring that underlying product. The derivative instruments you are probably most familiar with are exchange-traded futures and options. Other derivatives are negotiated between counterparties in the over-the-counter (OTC) market, sometimes with the help of an intermediary. OTC derivatives come in a variety of forms, including swaps, hybrid instruments, energy forward contracts, and trade options.

A New Era for Agriculture

Having explained derivatives, let me do the same for what I mean by the phrase, "a new era for agriculture." On a beautiful, cherry blossom spring day in early April 1996, the Federal Agricultural Improvement and Reform (FAIR) Act became law in the U.S. I think this legislation will have the same affect on public agricultural policy around the world that the collapse of the Berlin wall had on global public economic policy. Just as the fall of Communism encouraged both developed and developing nations to move toward a free market philosophy, so too has the fall of price supports and production controls pushed producers in many lands to make the transition to farming for the market and not the government. We have not seen U.S. agriculture rely this much on the market for almost 70 years. In my mind, this paradigm shift in the government's farm policy has created a new era for agriculture.

I believe the success of this grand experiment depends primarily, although not exclusively, on a producer's ability to develop a written marketing program that includes the prudent use of derivative instruments. In order to master this particular task, farmers will have to become business specialists in production agriculture. The reward for improving their business management skills and enhancing their computer literacy through continuing education will be the creation of their own financial safety net. This will occur as growers learn how to secure guaranteed revenue by transferring production and price risks to other parties.

What is encouraging about this process is that it is occurring as we speak. In just ten months there has been a phenomenal change in the agricultural community's attitude toward risk management. Witness the recent public declaration by 17 agricultural organizations of their belief in the economic importance of risk management. This took place on October 7, 1996 at the 22nd meeting of the CFTC Agricultural Advisory Committee. This attitudinal adjustment

was a giant leap forward in the development of 21st century business models for American agriculture.

The Use of Derivatives in a New Era for Agriculture

In this final segment of my presentation I will talk about derivatives and their use in different business models in a new era for agriculture. But first, because of a general misunderstanding concerning derivatives, I think it is important to repeat a point of view recently expressed by Jerry L. Jordan, president of the Federal Reserve Bank of Cleveland. "Derivatives," he said, "don't add to the risks inherent in a modern financial system. They do, however, allow risk to be borne more efficiently."

As you are aware, the current business models for poultry, hogs and cattle have allowed those industries to operate for decades without government production controls or direct price supports. As a result, these industries have been dynamic in responding to competition in the market place. Among these three, poultry is perhaps the best example of using a vertically integrated business model to improve an industry's overall efficiency and post impressive gains in market share. In just two decades, from 1975 to 1995, the poultry industry increased its market share by 17 points, from 24 percent to 41 percent of the market for meats. Although there are exchange-traded derivatives for poultry, pork and beef listed on the Chicago Mercantile Exchange, the futures contract for broilers is the only one not being traded, and thus classified as dormant.

The success of the poultry business model has not escaped the attention of those interested in the pork industry. For several years now a number of mega-size hog operations have copied most of the practices used by the integrated broiler business. However, Land O'Lakes, Inc. a Minneapolis, Minnesota-based cooperative recently announced its "aligned pork production system." According to Dan Glienke, Director of Pork Business Development for Land O'Lakes' Midwest Feed Division, this system will provide resources and technical skills for farmers committed to competing with the big integrated operations, while allowing them to maintain their independence. This approach also permits the grain farmer to diversify his/her operations. The Coop offers producers a "cost-plus" marketing program, which lenders prefer because it reduces their risk.

Speaking of transferring price risk in the pork business, there are several exchange-traded derivatives in use. The Chicago Mercantile Exchange offers futures and options on the cash settled Lean Hog and on the physical delivery Pork Bellies contract. These contracts have respectable volume and liquidity, plus they provide a useful price discovery mechanism. As the pork industry changes in a new era for agriculture, will the Lean Hog and Pork Bellies contracts experience the same fate as broiler futures? They might if Mr. Gary L. Benjamin, economist and vice president of the Federal Reserve Bank of Chicago, is correct. Recently Mr. Benjamin wrote,

“The hog producing-processing model that has evolved with the industrialization process in recent years suggests that all pork production for the U.S. could be supplied by 12 packing plants handling the output of some 50 megaproducers.”

While poultry and pork are gaining market share because of their business-first approach to delivering what the consumer wants, cattlemen still have some room for improvement. Not the least of beef's challenges is how to herd over 900,000 fiercely independent cow-calf producers toward changing their production and marketing practices. To move ranchers from their traditional practice of raising a generic commodity will require economic incentives that are the exception rather than the rule in today's cattle industry. Yet the trend toward offering the consumer a lean, tender, consistently tasteful, easy-to-prepare cut of beef is picking up steam.

Although there are a number of quality controlled beef programs, one that comes to mind is Ukrop's Supermarkets in Richmond, Virginia. Since 1992, Ukrop's has offered its own private brand of beef. Drawing on the superior genetics in some 20,000 head of cattle enrolled in Ukrop's program, the PM Beef Group of Ashland, Virginia, supervises every facet of the operation -- from the rancher's gate to the consumer's plate. The result -- Ukrop's shoppers get a money-back guarantee on all its beef. The few complaints Ukrop's does get are traced back to the animal the cut came from. The cause of the complaint is identified and corrected. In other words, the consumers' preferences drive every phase of this particular beef operation.

The derivatives used in the cattle business are the 32-year-old physical delivery Live Cattle contract and the cash-settled Feeder Cattle contract. Futures and options on both of these are traded on the Chicago Mercantile Exchange (CME). For at least the past 12 years, the CME and the cattle industry have been engaged in an ongoing lively debate over periodic changes to the delivery terms and speculative position limits for these two contracts. Other beef-related contracts currently being developed by the CME include 90 percent and 50 percent Boneless Beef futures.

Now let me shift gears and talk about derivatives in a new era for agriculture. An era that may see up to 50 percent of feed grains genetically engineered with special characteristics designed to meet the demands of “value-added” markets. Before giving some possible scenarios concerning how the business risks inherent in niche and generic crops might be managed, I would make this observation.

In my mind there are two different methodologies farmers can use to manage their business risks. The one has been in use for some time and focuses on predicting the weather and trying to guess the direction of agricultural commodity prices. The purpose of this exercise is price enhancement and derivatives are the primary instrument used. There is a well developed industry that provides information, advice, and the services necessary for farmers to try to enhance the prices they receive for the commodities they raise. The second risk management

methodology is one I like to describe as the "safety net" approach. Its development has accelerated at a rapid pace since the passage of the FAIR Act in 1996.

The USDA and the private sector are actively engaged in developing "safety net" risk management tools. Generally speaking, these tools fall into two somewhat different categories of contracts. The first, and at present the most widely used, is called revenue insurance. This terminology denotes the fact the contract is written by an insurance company. Among the examples that have been covered here today are Crop Revenue Coverage (CRC) and Income Protection (IP).

The second category is one I call revenue assurance. It is not written by an insurance company, it is evolving as we speak, and it will probably be used primarily by agribusiness companies. In any event, both revenue insurance and revenue assurance seek to transfer the production and price risks inherent in farming away from the producer in order to guarantee revenue for his/her operation.

As I mentioned a moment ago, you have already heard an explanation of revenue insurance-type "safety net" contracts, so, I won't duplicate that effort. However, I am going to talk about a concept that is on the drawing board and has the potential to work advantageously for revenue insurance and revenue assurance contracts alike. One way to develop this concept would be to offer it as an exchange-traded futures and options contract. This contract would, for example, settle on the <u>product</u> of CBOT December corn and Iowa Area Yield futures contracts. According to Dr. Dermot Hayes of Iowa State University at Ames, " the expected value of the <u>product</u> of price and yield is equal to the product of the expected values, <u>plus</u> the covariance." The covariance in this instance is a measurement of the tendancy of values to move or not to move together. The contract would trade this covariance, and as Dr. Hayes explained, "option premiums on a revenue product would be much less expensive than the sum of option premiums on separate price and yield contracts." As a result, this type of derivative contract could possibly reduce the cost of reinsurance for crop insurance companies. It could also afford agribusiness organizations an economical way to lay off the risks they take on when they enter into a revenue assurance contract with a farmer.

With regard to the revenue assurance contract between the producer and agribusiness company, it would work as follows. The company wants to maintain or initiate a long-term business relationship with the grower. Furthermore, the company wants to supply the seed, fertilizer, chemicals, fuel and financing to the farmer -- and manage his/her production and price risks by guaranteeing revenue per acre. There are a number of reasons why the company wants to provide this safety net for the producer, but the company must be able to transfer the risks it takes on in the process. A revenue futures contract like the hypothetical one I described earlier would facilitate the necessary risk transfer.

The final class of derivatives I will cover is "trade options." A "trade option," in its simplest form, is a contractual agreement between two parties that provides for the payment of a premium in order to secure the right, but not the obligation, to make or take delivery of the commodity described in the contract. Trade options have been used for decades by producers, processors and others involved in metals, energy, and financial products businesses, but they are currently subject to a regulatory ban for agricultural commodities. Nevertheless, let me illustrate how an agricultural trade option might work if the prohibition was lifted.

For example, a farmer who entered into a trade option contract with an elevator would pay a premium to the elevator for the right, but not the obligation, to deliver a certain quantity of grain within a specified time frame at a price the counterparties had agreed upon when they signed the contract. If the local cash price on the delivery date is higher than the contractual price, the farmer could abandon the option and sell his/her commodity to the highest bidder. There is a strong likelihood the elevator would cover the risk it incurred in granting the option with an offsetting position in an exchange-traded option covering the same commodity.

What is the advantage to the farmer? The contract itself fixes a price that may allow the farmer to lock in a profit -- in effect, a price floor -- lets the producer retain the opportunity to make more money if the price is higher at harvest. In a worse case scenario, the option at least limits the potential for loss to an amount the producer has decided he/she can afford to self-insure. However, once again, the grower can walk-away from the unattractive contract price and sell in the cash market if prices are higher at harvest time.

Another possible use of the agricultural trade option concept would be in the case of "value added" feed grains -- where there is no matching exchange-traded derivative available. For example, a processor enters a trade option contract with a group of farmers like the Kearney (Nebraska) Area Ag Producers Alliance. The counterparties agree on the fob price, the quantity, and the time frame for delivery of a high oil, high protein corn. The processor has specified the delivery dates and quantities to coordinate with all its other purchases in order to achieve a "just in time" delivery system. This delivery arrangement is predicated in part on the processor's need to maximize operational efficiencies, including availability and attractive pricing of rail, barge, truck or ocean freight. Among the other advantages offered by "just in time" delivery are opportunities to adjust to unexpected weather conditions, to achieve some flexibility in matching production to sales, or to take advantage of a better cash or other contracted price at a particular time. Obviously, for the processor there are economic benefits to achieving these results, but it might require changing the quantity the Producers Alliance has agreed to deliver on certain dates. So the processor wants the right, but not the obligation, to take delivery on the set days of a lesser or greater quantity than called for in the contract. The counterparties do know exactly what the lesser and the greater amounts are, because those quantities were specified in the option clause of the original deal. The processor can exercise this right with only 72 hours advance notice prior to the delivery dates spelled out in the contract. However, the number of times the processor can exercise this option within a given time frame is limited by the contract. For these

options the processor is willing to pay a premium to the Alliance. If this sounds futuristic, it may be for agriculture, but it is similar to a trade option presently being used daily in the natural gas business. My time is about up, which means you have been saved from any further examples of derivative contracts.

Conclusion

In conclusion, let me say I am convinced that in order for producers, processors, merchandisers and exporters to be profitable in this new era for agriculture, they must have the freedom to develop innovative ways to use both exchange-traded and over-the-counter derivatives to manage their business risks. Unfortunately, as I noted earlier, the CFTC currently has a ban against agricultural trade options, like the last two examples I have just given. However, the Commission plans to take another look at the ban in he near future and it is my fervent hope that sooner, rather than later, the Commission will consider lifting that ban, with or without restrictions.

RISK MANAGEMENT FROM A PRODUCER'S POINT OF VIEW

by

John C. Kintzle
Iowa Corn and Soybean Producer

Over the years, much has been written about risk management for U.S. Agriculture. But at no time in the history of modern production agriculture has this issue been more thoroughly discussed. Hardly a day goes by where the American producer cannot read a farm publication or attend a marketing meeting without someone expounding the importance of risk management.

We, the producers, hear it talked about from the halls of Congress to the local coffee shops. Having farmed for 32 years, I have always known there is a certain amount of risk in farming. But, today I have everyone reminding me!

Risk Management in Transition

As I mentioned in my opening statement, risk has always been associated with American agriculture. Not only are producers faced with weather risk, but we are also faced with marketing risk. Just in the last ten years alone, I have farmed through the worst drought since the 30's (1988) and the worst flooding in Iowa history (1993). During that time, the price of corn fluctuated from $2.20 a bushel to $5.50 a bushel. So why all the attention to risk management today?

Probably the number one reason for all this attention is the "Fair Agriculture Improvement and Reform Act" (FAIR), better known as "The Freedom to Farm Act," which became law in 1996. Other factors changing the risk environment of producers are changing global trade patterns, grain reserve policies and changing climate patterns.

Under the new Freedom to Farm Act, crop subsidies are no longer tied to price fluctuations in the market. Instead, producers receive fixed payments over a seven-year period, on a declining basis, which will end in 2002. Under the new law, the risk becomes greater because the producer must rely totally on the marketplace, especially as we near the year 2002. It can also be argued that the Freedom to Farm Act has increased the risk of the producer because much of the first two year's payments are being capitalized into higher land rents and higher land values. This means that the fixed farm payments are being used to increase production cost instead of retiring debt. With the global competition we face today, this certainly increases risk to the American producer.

Global trading patterns have always changed, but will probably do so at a faster pace as we enter the next century. In the 70's and early 80's, everyone thought that the Soviet Union was the answer to our world trade woes. Look where they are today. In the 90's, China is being looked upon as a major buyer of U.S. agricultural products. That market is indeed very large, but could be disrupted by human rights issues and other political problems. Along with changing global trade patterns, several major grain-producing countries are de-emphasizing grain reserves. These declining reserves, combined with the major reductions in U.S. grain reserves, means increased grain price volatility.

One of the major risks in production agriculture is the weather. There is much talk that the Earth's climate pattern is changing and we are experiencing a warming trend. Many will argue that that is not true. One thing we know for sure, corn yields have been quite variable in Iowa since about 1975 compared to the previous 25 years (1950 - 1975). The yields, on my farm in Eastern Iowa, have varied much more the past 10 years when compared to the first 20 years that I farmed.

Even though technology will continue to push the yield curve upward, weather will continue to be one of the major risks producers will face in production agriculture. Learning to manage price and yield risk will be extremely important as we transition production agriculture under the new farm law and increased global competition.

Managing Price Risk

The number of ways to manage price risk is as numerous as the streets that converge at the Capitol in Washington DC. They will all get you to the Capitol, but no one knows for sure which street is the best way. If you don't believe me, just ride with a DC cab driver.

The tools available for managing price risk today include storage, forward cash contracts, selling futures, using options, basis contracts, and numerous other strategies. Probably using any of the tools I mentioned would be better than doing nothing and being at the mercy of the market at harvest time.

Storage on the farm is one of the most basic risk management tools and is used by a majority of producers. It allows the producer to sell at different increments over the year, thus increasing the odds of getting an average price. The downside, of course, is holding the grain too long and passing up good pricing opportunities.

Forward cash contracts are another tool used by a large number of producers. Farmers can forward price with their local elevator anytime during the growing season for delivery at a later date. A producer might lock in a good price from a summertime weather scare and then deliver the product at harvest time. The biggest risk a producer would have with a forward contract would be a crop failure and not having the product to deliver. I will be discussing a new tool to manage that risk later.

Selling futures, or hedging, gives a producer greater flexibility than cash instruments, but certainly requires the most discipline and understanding of the market. To trade futures, a producer must start an account with a futures broker and deposit margin money to guarantee that position. If that position shows a loss, a deposit of funds must be made on a dollar-to-dollar basis. The producer will also incur commission fees on their position. Financing a futures account can be a major obstacle if a producer plans to stay with a hedge all the way until harvest and prices rise. Because a producer must margin his account if prices rise, it is very important to have a banker that also understands the market.

Since 1985, farmers have been able to trade options on the commodity futures. Using the option market is similar to buying an insurance policy. An option to buy futures is a call option which is used by most producers. If a farmer paid 15 cents a bushel to buy a December $3 corn call and the market went to $3.50 a bushel, the producer would receive a majority of that price increase. If the market went below $3 a bushel, the producer would only lose the 15 cent premium, no matter how low the market went. When producers use options, they limit their risk to the price of the call, which is why options have become quite popular among producers.

As I had mentioned earlier, there are several strategies for a producer to price their commodities, some more risky than others. Like most things in life, the bigger the reward, the larger the risk.

Managing Yield Risk

Managing yield risk has always been a challenge for the American producer because yield is extremely important. Producers can have the best of prices, but if they have little or nothing to sell, the results can be disastrous.

Producers can control their yield risk, somewhat, by making sound management decisions. A producer could install an irrigation system on his or her farm to lower the risk of a crop failure in a dry year. Installing a drainage system on a farm would lower the risk of a crop failure in a year when there is excessive rainfall. Both of these actions could lower a farmer's yield risk, but would require a large capital expense, especially irrigation.

Not all yield risk management tools need to be expensive. In fact, rotating crops or using a no-till system could lower a farmer's cost of production. Since July is the most stressful month for corn in Iowa, and August is the most stressful for soybeans, producers in Iowa could lower their overall yield risk significantly by raising a 50/50 mix of corn and soybeans. Choosing the right seed, chemicals and fertilizer for their farm are other choices producers have which limit their yield risk.

Yield risk is always on the minds of producers from the day they plant their crop to the day they harvest it. Producers can make all the right management decisions during the growing season, but in the end, Mother Nature always calls the final shot.

Because weather is such an unknown, producers have always looked for ways to manage that risk. They have used hail insurance for years to manage yield risk across the U.S. It is sold by a number of companies and is quite popular yet today in the high-hail areas of the country.

Federal Crop Insurance, better known today as Multi Peril Crop Insurance (MPCI), has been available to the producer for several decades. Only within recent years, has it had wide-spread use. However, today MPCI is being purchased by more producers than ever before. There are probably many reasons for this change; increased cost of production; crop failures in large areas; pressure from bankers and many others. But the main reason for this change is the action taken by the U.S. Congress.

In the past, whenever there was a major crop disaster in a large area of the country, Congress would give ad hoc disaster relief. There wasn't much incentive for producers to buy MPCI coverage when they knew, under political pressure, Congress would come to their rescue. Congress finally sent the message that MPCI would be the basic tool for disaster relief in the U.S. Since that time much has been done to improve MPCI. By working together, the government and private insurance companies have brought new and innovative products to the American producer.

Managing Yield and Price Risk With New Products

As I mentioned earlier, many producers use forward contracting to lock in a profitable price. One of the fears in doing so is that a producer would not have the bushels to deliver at harvest time and the price is higher. If a producer sold 50,000 bushels of corn at $2.50 and only produced 40,000 bushel, he or she would be 10,000 bushels short on the contract. If the price, at harvest, was $3.00 a bushel, the producer would have to buy 10,000 bushels of corn at $3.00 a bushel on the open market and then deliver it to whomever the contract was with for $2.50 a bushel. A new plan, called Crop Revenue Coverage (CRC), addresses this problem.

Under CRC, the producer selects a revenue per-acre coverage. The insurable price level is based on the new crop futures prices in February, rather than the Farm Service Agency's projected price. The insurable price times the yield election equals the gross income guarantee. If prices reach a higher level by harvest time, the income guarantee is raised accordingly, but it will not be lowered. If the producer's actual gross revenue, based on the actual yield and the harvest price, is below the insured level, an indemnity payment equal to the difference is received.

CRC was available in Iowa and Nebraska, for both corn and soybeans, for the first time in 1996. It will be expanded to several other states in 1997.

Also, for 1997, a new product will be available in Iowa called Revenue Assurance. It will provide 65 or 75 percent of a farm's expected revenue for corn, soybeans, or both. A farmer's expected revenue will be based on the government's posted county price multiplied by the farmer's proven historical yield.

These new products will certainly help producers to manage crop production risk in the years ahead. Just as new technology will continue to change the way farmers produce commodities, new and innovative insurance products will be necessary to help American farmers to better manage their risk into the future.

Risk Management Into The Next Century

Even though American agriculture producers will continue to have some of the world's best technology for crop production at their fingertips, price and yield risk will be a part of their life. It will be up to the American producer to manage that risk into the next millennium to the best of his or her ability. As we approach the year 2002, I don't believe there will be the dollars in the U.S. Treasury or the will of the American people, to return farm programs to the days prior to "Freedom To Farm."

As American agriculture goes down this new road, I hope we are not haunted by that old saying, "Be careful what you wish for, you might get it." But, as my father always said about farming, "If it was easy, everybody would be doing it."

FOOD NEEDS FOR THE 21ST CENTURY[1]

by Alex F. McCalla[2]
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I. Introduction

I would like to redefine the topic assigned me as the challenge of providing food security for all in the 21st century. Food needs suggests to me, at least, the simple arithmetic of multiplying population by basic nutritional needs. Food security for the 21st century is much more complex and therefore much more difficult to predict. It is about more than adequate supplies. It is also about reducing undernutrition and enhancing development.

Food security means to me that every individual has access to enough food to maintain a healthy and active life. Ensuring food security for all is a challenge with many dimensions. These are outlined in Matrix 1. There are issues of food security at the household, national and international levels and the focus of policy intervention clearly changes as the time frame lengthens. In the short term, reducing hunger clearly must focus at the household level with enabling actions by nations. Globally there is little to do except provide emergency food aid if it is available. As the time frame lengthens, economic and social development at the national level to increase access of the poor households to food becomes paramount. The international role is to support that development, provide support for international agricultural research and provide a fair trading system. An effective and fair international market those nations who are better at other things than growing food assurance that global markets will be open to them. In the long term productivity enhancement, adequate global supplies and a well functioning trading system are critical.

Thus, it is clear that food security is much more complicated than projecting adequate global supplies for the next thirty years. Understanding the challenge begins on the demand side. Most projections of population suggest a global population of around 8 billion people in 2025, an increase of about 2-1/2 billion people from the 1990's. Population is one of the two drivers of aggregate food demand, income is the other. With modest income growth, food needs in developing countries could almost double in the next 30 years. The composition of aggregate

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[2] The views expressed are those of the author and do not necessarily represent the views of the World Bank.

Matrix 1 The dimensions of food security: Critical variables

	short-term (1-3 years)	medium-term (5-15 years)	long-term (25-30years)
Household	Access to Food Nutrition And Health	Access to Income or means to produce food	Poverty eliminated Social infrastructure
National	Safety Nets Nutrition and health	Economic Development Sustainable Production Systems Agricultural Research	Rural and economic development Sustainable Production systems Agricultural Research
Global	Grain Stocks Food Aid	INTERNATIONAL RESEARCH FAIR TRADING SYSTEM Sustainable Global Supplies	INTERNATIONAL RESEARCH FAIR TRADING SYSTEM Sustainable Global Supplies

demand also changes with rising income levels and with where people live. Most of the growth in population over the next 30 years will occur in developing countries. Further in this same period, urban population in developing countries will increase by a number equivalent to global growth (2-1/2 billion). With rising incomes and urbanization, the composition and characteristics of food demand will be significantly altered. More of the food supply will have to be processed, transported and stored. In parallel, the share of the developing country dwellers who can depend on subsistence agricultural production will decline sharply. The implications of this are that a much larger share of food production will enter markets both within and between countries.

These developments on the demand side clearly raise challenges for the global food production system. The fundamental questions are: can the world produce enough food to feed 8 billion and at the same time hopefully reduce the number of undernourished below the current level of 800 million? If so, where will it be produced? Will we break away from the mental mind set of equating food security with national food self-sufficiency and ask where the food should be produced? And finally, does the world have a trading system that will allow increasing quantities of food to flow from surplus to deficit areas?

It is to these questions that the rest of the paper is addressed. I use the three aspects of food security - availability, access and effective utilization (nutrition) - as the framework for my discussion. I will look at four time frames - retrospective (1961-1990), recent past (1990's), and the current situation and the future both medium (2010-2015) and longer term (2020-2025). A summary of the case I shall make is presented in Matrix 2.

II. **Performance to Date**

1. Retrospective (1960s-1990)

a. Availability

Despite periodic predictions of imminent shortages (1965-66, 1972-74, 1988) the world did remarkably well in expanding food production over the 30 year period 1960-1990. World cereal production more than doubled, per capita food production increased 37%, calories supplied increased 35% and real food prices fell by almost 50%. Regionally average calories available per day increased significantly in the Near East and North Africa, East Asia and Latin America to levels of 2700 calories per day or higher. South Asia grew more slowly and still is a region with significant undernutrition. But Sub-Saharan Africa experienced a decline in per capita food availability. The increases in production came from three sources - biological yield increases, land use intensification (irrigated acreage in developing countries doubled) and expanded area.

b. Access

Yet despite an overall effective global performance, under nutrition remained a serious problem. In 1969-71, 920 million people were undernourished which represented 35% of

Matrix 2 - Elements of Food Security

Time Frame	Availability	Access	Utilization
Retrospective (1961-1990)	**Global** • World Cereal production doubled • Per capita food production increased 37% • Calories supplies increased 35% • real food prices fell by 50% **Regional difficulties** Sub-Sahara Africa - per capita food supplies declined South Asia - slow growth	**1969-71** 920 million people were under nourished. This was 35% of developing country population	Close to 1 billion suffered from deficiencies in one or more micronutrients
Recent Past	**1994-1996** > 70% increase in grain prices **1995** - harvested area down 10% almost all of it in 5 Major exporters and the FSU Stocks fell by 50% Stocks to use ratio fell to 13.2% lowest in history	**1990-1992** 840 million under nourished, 20% of developing country population	1.6 billion at risk of iodine deficiency about 2 billion people affected by iron deficiency (FAO 1996)
Current	• Prices have returned to pre 1994 levels • global production up 7% in 1996 • 5 Major exporters production up 15% in 1996	1996 -- 800 million under nourished	

developing country population. By 1990-1992, the FAO estimate was 840 million undernourished people, now 20% of developing country population. In relative terms there was progress though regional performance varied widely. In 1969-71, 76% of the undernourished lived in Asia (51% in East Asia) and 11% in Sub-Saharan Africa. In 1990-1992, 60% lived in Asia (30% in East Asia) and 25% lived in SSA. But in absolute terms the number diminished very little.

c. Utilization

Though firm data is unavailable it is likely that over 1 billion people suffered from a deficiency in one or more micronutrients (e.g. Vitamin A, iron, iodine, zinc & copper) in the 1960's. In the early 1990's, estimates are that 1.6 billion people are at risk of iodine deficiency and about 2 billion people are affected by iron deficiency (FAO 1996, Paper 5, pp. 6-7).

In sum, improved performance on the supply side, relative but not absolute improvements in reducing undernutrition and an apparent increase in the incidence of micronutrient deficiencies. Therefore, argue many, supply was not a constraint.

2. The Recent Past to the Present (1994-1996)

a. Availability

World grain prices experienced "a spike" in 1994-1996 with wheat, corn and rice prices increasing by 70-100% by April 1996. Since then prices of wheat have returned to 1994 levels. As prices escalated and the stock to use ratio plummeted to its historical low (13.2%) concerns about whether this was the beginning of the period when demand finally outruns supply or simply a short-term perturbation, broke out. Those arguing the case for a prolonged period of shortages and rising prices cited declining growth rates on yields in the 1990s, losses of land from production and water and environmental constraints as powerful indicators for the future. Others argued it was the market overacting to a bad U.S. crop in 1995 and policy changes in the EU and the USA which lowered farmers prices and reduced stocks. They argued production would expand in 1996 and prices would fall back and continue the long-term trend of declining real grain prices.

A more careful analysis of the events of the last two years suggest a more complex set of causes (Ingco, Mitchell and McCalla). Starting with the 1991 European Union (EU) Common Agricultural Policy (CAP) reform, followed by US policy changes in 1995 and continuing adjustments to lower prices in Australia and Canada caused harvested grain areas to decline and stocks to decrease significantly. Between 1981 and 1995 harvested area in the five largest exporters - U.S.A, EU, Canada, Australia and Argentina contracted by 34.5 million hectares accounting for 53% in the global decline in grain area harvested of 65.3 million hectares. Another 41% of the decline is accounted for by reduced grain area in the Former Soviet Union (FSU). This contraction represented an almost 10% reduction in global harvested area. The resulting

decline in output, coupled with policy changes which reduced public stock holding, contracted exporter stocks from 262 million metric tons to 58 million tons (88 percent of the decline in world stocks) and global stocks by 233 million tons, a more than 50% reduction. These trends coupled with lower 1995 production triggered a sharp run up in prices between May of 1995 and April of 1996. A 15% increase in production in these vie exporting countries and a 7-1/2% increase globally in 1986 caused wheat and corn prices to drop sharply to pre 1994 levels by early 1997. Rice prices remain however at close to peak levels. It will clearly take more time for stocks to rebuild. Thus for the moment those arguing that this was a spike, not a change in long-term trends, seemed to win the shortrun argument at least for wheat and corn. But what of the future?

III. The Future

Views of the challenge of food security for all diverge more strongly as the time frame is lengthened. Those using economic projection or simulation models, based significantly on history, tend to project sufficient global supplies at least until 2010. Those projecting on the basis of resource availability and environmental constraints (perhaps these could be called ecological models) all are generally much more pessimistic. The most extreme view combines resource constraints with biological pessimism and foresee serious problems ahead (Brown and Kane). Picking ones way through this mine field is fraught with difficulty and occasional danger. The very nature of projections using compounding growth rates of population and income compared to yield growth rates means that food gaps grow rapidly if the growth rate of demand exceeds supply. In the opposite case, if supply growth rates augmented by land expansion exceed demand growth, real food prices decline (the scenario of most of the last 100 years). Therefore, we look first at the medium term (10-15 years ahead) before turning to the more problematical longer term (20-25 years). Much of the analysis that follows comes from a recent Bank publication (Ingco, Mitchel and McCalla).

1. Medium Term (2010-2015)

a. Availability

Several recent simulation studies have projected global cereal or food balances to 2005, 2010 or 2015. Three studies done at IFPRI, FAO and the World Bank make projections to 2010 and come to similar conclusions (Agcaoili and Rosegrant, 1995; Alexandratos, 1995; and Mitchell and Ingco, 1993). All three studies project grain yields to increase 1.5-1.7% per year, area harvested is expected to increase modestly, global grain demand is projected to grow more slowly and trade in grains is expected to increase. All three studies expect real grain prices to remain constant or decline. Regional food problems are expected to persist in South Asia and especially Sub-Saharan Africa.

In reporting on a conference at IFPRI which reviewed the three projections to 2010, Islam (1995) concluded:

Matrix 2 - Elements of Food Security (cont)

Time Frame	Availability	Access	Utilization
Future: **Medium term 2010-2015**	Most projections suggest adequate global supplies but some are concerned about resource constraints Differences between optimists and pessimists, focus on yield potential, land expansion/loss and water availability	World Food Summit target of 400 million undernourished by 2015 FAO projects 680 million in 2010	Forcast difficult, will be conditioned by success in poverty reduction and improved nutrition delivery systems
Longer Term 2020-2025	Food needs in developing countries could nearly double Challenge is serious and will be impossible without appropriate polices and continued expanded investment in research for the development of new technology	Goal: to eliminate under nutrition This would increase projected food demand by 10%	

"There was general agreement the world food supply in 2010 would probably meet global demand but regional problems would occur. South Asia and Sub-Saharan Africa were recognized as the most vulnerable regions. The key to future food supplies was seen as increased productivity, that is, yields must continue to rise; to accomplish this, sustained support for investment in agriculture, including research expenditures, would be needed."

A contrary view is presented by Brown and Kane (1994) who argue that there is little backlog of unused agricultural technology, that fish production has reached its biological limits and that rangeland carrying capacity has been exceeded. They further argue that the demand for water is pressing hydrological limits, that fertilizer responsiveness is declining and that much cropland (especially in China) is being lost to degradation, urbanization and industrialization. The resulting conclusion is very pessimistic with the only possible solution being greatly expanded trade which they see as problematic.

I will return to discuss these striking differences after we discuss the longer term scenarios.

b. Access

Access to food in the future very much depends on success in reducing poverty, especially in Rural areas, and a stimulating widely shared employment intensive growth. The recently concluded World Food Summit set as its target, reducing the number of undernourished to 400 million by 2015. FAO projects, based primarily on a continuation of past trends, that the number of undernourished would be 680 million in 2010.

c. Utilization

Success in reducing nutritional deficiencies of all sorts in the future depends both on improvement in overall nutritional status (access) but also with expanded nutritional education programs and improved nutrition delivery systems. What can be said with assurance is that overall economic growth will not eliminate nutritional issues.

2. The Longer Term (2020-2025)

a. Access

IFPRI (1995) also makes projections to 2020 which show a relatively good global food supply and demand balance in 2020. Real grain prices continue to fall (20% between 1990 and 2020) and real meat prices fall by 10 percent. Trade expands substantially, with imports by developing countries doubling. Food problems persist in Sub-Saharan Africa where imports are projected to triple, likely beyond the region's capacity to pay for them.

IFPRI also reports an alternative scenario where there is lower investment in agricultural research combined with slower income growth. This decline in public investment in agricultural research has severe consequences for the global food situation as it causes real prices to rise and malnutrition to increase. The IFPRI scenario highlights how sensitive long term projection models are to small changes in a particular parameters, in this case research investment.

How then can the economic modellers and the ecological pessimists reach such different conclusions? The reason is found in but four critical projection parameters (assuming they generally agree on the demand side) (McCalla, 1994). These are:

1) the rate of increase in biological yields over the next 30 years
2) the amount of land to be added or lost from agricultural production
3) the amount of land subject to intensification through irrigation
4) the impact of environmental degradation on food production capacity

Being relatively optimistic by projecting even a modest decline in past growth rates on the first three, produces the optimistic scenario given declining population growth rates. Projecting the apparent decline in yield increase in the 1990s (less than 1%) to 2025 plus land loss, no new irrigation and severe resource constraints can lead one to be very pessimistic.

But there are also several things both sides agree on - the need for continued investment in technology generating agricultural research and that farming systems cannot degrade the environment and must increase the efficiency of resource use.

In my judgment the optimists are too optimistic and the pessimists are too pessimistic. Reality suggests that feeding 2-1/2 billion more people well is an enormous challenge. Growth in agricultural output in the long term must come primarily from rising biological yields rather than from area expansion or intensification through irrigation. Why? Because most fertile land is under cultivation and the really suitable and low cost areas for irrigation have already been used. With population growth and urban expansion there will be rising competition for land and water from urban and industrial uses.

Doubling yields in complex farming systems without damaging the environment is an enormous challenge. The challenge is worldwide and both technological and political in nature. We require new technology to allow the development of new, high productivity, environmentally sustainable production systems. It is not more of the same with purchased inputs intensive monoculture. "The political challenge can only be met if international and domestic policies, institutional farm works, and public expenditure patterns are conducive to cost-effective and sustainable agricultural development". (World Bank, 1996)

b. Access

Two general comments under the access heading. First, if the world is successful in eradicating poverty and malnutrition we should both rejoice and redouble our efforts to intensify sustainable production systems. Why? Because eliminating malnutrition would bring 800 million people into the commercial market increasing demand by at least 10%.

The second point to be made is that all of the projections - both optimistic and pessimistic - foresee greatly expanded international trade particularly in grains. Developing countries in particular are expected to substantially increase their dependence on international markets. Further, rising incomes which cause expanded consumption of livestock products to increase demand for feed grains. In this future model, a non-distorted and freely working international market is critical both for exporters such as the U.S. and for importers whose domestic food security will increasingly depend on a reliable and relatively stable international market.

IV. **Concluding Comments**

Let me summarize my conclusions. Future global, national and household food security in the long run can be accomplished if we can develop sustainable production systems capable of nearly doubling output; if we have in place domestic and international policies and institutions which do not discriminate against agriculture and provide appropriate incentive to hundreds of millions of farmers around the world; if we continue to invest in public agricultural research such as through the Consultative Group on International Agricultural Research (CGIAR) and if we stay the course with removing distortion to freer agricultural trade in all countries.

These are four big "ifs" but they must be met. For without them the long term prospects are not very pleasant to contemplate.

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Market Stability and World Food Security: What Do Importers Face?

David Blandford[1]

International trade plays a vital role in the world's food supply. Although imports of grain account for less than 20 percent of global consumption, this is actually a large figure. Grain is a bulky commodity and a large amount is fed to livestock in the countries in which it is harvested. Developing countries are the major importers of foodgrains, such as wheat and rice. Developed countries have traditionally dominated imports of feedgrains, but rapidly industrializing countries, particularly in Asia, are becoming increasingly important purchasers.

Importers have very similar interests in terms of international markets. They want assured access to supplies of grain of an acceptable quality at "reasonable" prices. Being economically rational, they are happy to obtain grain at the lowest possible cost. For the most part, they do not care whether this results from subsidies by exporters. However, importers tend to be more concerned by the possibility that prices will be "unreasonably" high, and especially that they may face rapid increases in prices.

Despite expressions of concern about food security, most wealthy importing countries do not have to worry about international grain prices. Even if their reliance on imports is great, wealthy countries can afford to pay for a commodity that accounts for a small part of their total import bill and a modest share of consumer expenditures. Poor countries, on the other hand, do not have such a luxury. For them rapid increase in the price of imported grain may mean hardship for their people and the threat of social unrest.

Has the market picture changed?

Political concern about price instability and food security seems to vary cyclically. In the early 1970s, a rapid increase in grain prices triggered by poor harvests, large purchases by the Soviet Union, and a run-down in stocks, particularly US stocks, precipitated the 1974 World Food Conference in Rome. There were fears that the world would not be able to produce enough to meet the basic aim of the conference that "every man, woman and child has the inalienable right to be free

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from hunger and malnutrition". And yet, for most of the years following the Conference, the world was awash with grain. Many governments struggled to deal with stocks that built up under price support programs. They used incentives to try to convince farmers to produce less, and subsidized exports. International grain prices, after adjusting for inflation, continued to decline at or above the 1 percent average annual rate that has applied since the early 1960s (Blandford).

The picture is now very different. There have been major changes in policy in key exporting countries, particularly the European Union and the United States, a resumption of rapid growth in global demand for grain, particularly in newly industrializing countries, and the signing of the Uruguay Round Agreement (URA) limiting the use of export subsidies. Following two years of reduced world production and falling stocks, particularly in the major exporters, international wheat and corn prices rose in 1995/96 to their highest level in 20 years. This change in the market meant that renewed attention was focused on food security issues in the lead up to the FAO Food Summit in November 1996.

What will happen to stocks?

In terms of factors affecting the potential variability of international prices, the greatest change over the past few years has been the virtual elimination of public stocks of grain in OECD countries[2]. By the end of the 1995/96 season, stocks of wheat in OECD countries had fallen to roughly 19 percent of production, compared to an average of 29 percent during the preceding five years. In an era of budget restraint, governments are increasingly unwilling to fund stockholding and expect this to be undertaken by the private sector. It is difficult to determine the extent to which the reduction in the role of the public sector will be replaced by private stockholding in OECD countries, but some increase in private stocks seems likely. At the same time, stocks in the non-OECD area have largely been maintained and consequently their share of the world total has increased. The share of world wheat stocks held in the non-OECD countries is likely to be around 65 percent by the turn of the century, compared to roughly 55 percent during the early 1990s (OECD, 1996).

Public stocks of grain, particularly those in major exporters such as the United States, have provided an important buffer against fluctuations in production created by the weather. While the acquisition and release of public stocks in the United States can hardly be said to have been driven by the desire to reduce fluctuations in international prices, to a large extent the amount of stocks has varied inversely with international prices on a year-to-year basis. If we look at the

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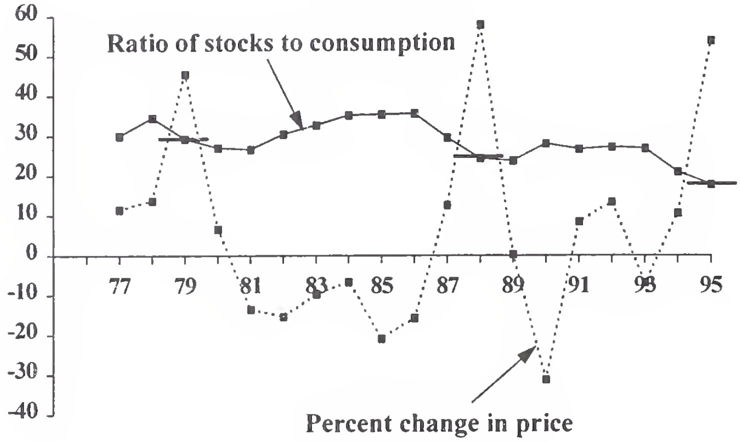
[2] The 29 members of the OECD are Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea (Republic of), Luxembourg, Mexico, Norway, Poland, the Netherlands, New Zealand, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States.

period 1975-95, for example, the correlation between season-to-season changes in total US wheat stocks and changes in an indicator world wheat price (defined by the Argentine export price) is 0.66. From a statistical perspective, this indicates a highly significant relationship between the two. By way of contrast, for the same period, the correlation between wheat stocks and prices in the European Union was 0.35. Given that EU policy has been aimed specifically at ensuring stability in domestic wheat prices (and, in particular, maintaining a high price level relative to world markets) it is not surprising to find that this correlation does not indicate a statistically significant relationship.

The extent to which stocks vary inversely with world prices is important since it reflects the degree to which variations in international prices are transmitted to the domestic market. In many countries, various types of trade barriers, ranging from levies or quotas to state control of imports, have been used to ensure that domestic prices are kept relatively stable (and often above world prices). Changes introduced as a result of the Uruguay Round agreement have altered this picture to only a limited extent. The existence of insulating policies means that international price variations are not fully transmitted to the domestic market. Production, consumption and stocks do not react to changes in world prices, and consequently the amount of adjustment that has to occur in other more open countries to unanticipated fluctuations in production is increased. For countries that are large grain consumers, particularly of livestock feed, this is very important. Adjustment in the feeding of grain to livestock is one of the principal "shock absorbers" that exists in global grain consumption. Thus the use of coarse grain for animal feed fell sharply in 1995/96 in OECD countries (about 10 percent) as the result of higher grain prices. Such adjustment, plus increased production, caused world prices for wheat and coarse grains to fall by 25-30 percent from the peaks reached in 1995/96.

The stocks-to-use ratio provides an important indicator of when the world is at risk of experiencing rapid increases in grain prices. If stocks are low relative to consumption, there is clearly a greater risk of a run-up in prices if production is below average. But it is important to note that the ratio at which price spikes are likely to occur is not fixed, as is sometimes assumed. In fact this ratio has been declining over time. The three major episodes of sharp upward price movements in wheat since 1975 occurred with substantially different stocks-to-use ratios (figure 1). In 1979 a run-up in world wheat prices took place with a stocks-to-use ratio of 30 percent, whereas a broadly similar price run-up in 1995/96 occurred when the ratio was less than 20 percent.

Figure 1. PRICES ARE BECOMING LESS SENSITIVE TO STOCK LEVELS
World wheat



Source: OECD Agricultural Outlook Database.

An explanation for this decline in the sensitivity of prices to the level of stocks is not hard to find. The last twenty years have witnessed an enormous increase in efficiency in the functioning of international grain markets. Information on availability and demand has become more accurate, and easier and faster to obtain. Improvements in infrastructure in many countries mean that available supplies can be moved to market positions more rapidly. The revolution in communications technologies and computing have made a significant contribution to efficiency. There are fewer stocks tied up under government programs. In some cases domestic markets have become more open, allowing more of the adjustment to a short global crop to be reflected in consumption. Thus the world can expect to have less variable grain prices with lower levels of stocks. This is good news, since storage is expensive and few in the private sector are prepared to absorb the costs of holding significant grain stocks from year to year.

While it is likely that the volume of stocks held in private hands will increase as governments withdraw from the business of supporting prices, it is unlikely that the private sector will hold as much, on average, as the public sector has in the past. When governments are in the habit of intervening in the market to support prices, there is a tendency for private stocks to fall to low levels. There is little money to be made if prices are stable. Costs for grain users can be reduced by relying on publicly financed storage to ensure regularity of supply. Thus public stocks tend to crowd out the private sector. When governments move out of the picture, private stocks tend to increase, essentially to manage the flow of transactions within the season. The management of intra-seasonal storage can therefore be expected to become more significant for the private sector in coun-

tries where governments are withdrawing from the grain market. But the private sector is unlikely to find it profitable to hold large carryovers of stocks from one year to the next.

What more can be done?

Considerable potential exists in international grain markets for adjusting to unanticipated shocks. Producers and consumers respond rapidly to price signals, when these are transmitted to them. The rapid adjustments in supply and demand in response to the high prices of last season are evidence of this. However, there are two areas in which more can be done to promote greater stability. The first of these is through further reform of agricultural and trade policies. The second is the development of private sector mechanisms to deal with price variability and risk.

As indicated above, there have been some positive steps in reforming domestic policies that contribute to distortions in international grain prices. The Uruguay Round agreement helped to consolidate such domestic reforms by putting restrictions on the use of export subsidies, increasing market access, and reducing the level of support. However, the actual progress made through the URA in opening up domestic grain markets to trade was modest. The replacement of non-tariff barriers by bound tariffs was a significant step, but many of the tariffs fixed under the Agreement are high, if not prohibitive (OECD, 1995). The market access provisions permit higher imports, but do not necessarily create a strong linkage between domestic and international prices, particularly if the import commitment is met through purchases by state trading agencies, whose activities are generally not transparent. Some countries use export taxes when world prices are high in order to maintain domestic price stability. There still exists a substantial amount of insulation of domestic markets from the international grain market.

Further progress in reducing trade barriers and the consequent globalization of markets would help to increase the collective capacity to adjust to shocks. Policy reforms that do not lead to the closer integration of domestic and international markets can actually increase the potential variability of international prices. What is required is reductions in tariffs to levels that result in the effective transmission of changes in international prices to domestic markets. The resulting market integration would do much to contribute to greater price stability at a global level. Until such integration occurs, it is inevitable that policies and policy interventions will continue to have a potentially destabilizing effect on international prices.

The second area in which changes could be achieved is through the growth of private sector mechanisms for managing price variability and risk. In many countries in which domestic grain prices have largely been controlled by the govern-

ment, agents (producers, intermediaries and consumers) have limited experience with strategies for dealing with price variability. When the government guarantees prices, farmers or merchants have little need to develop a marketing plan for their grain, to decide when to sell or to store, whether to contract forward, or whether to use futures or options as part of a risk management strategy. When the government steps out of the grain marketing picture, there is a need for agents to develop such skills and to be able to take advantage of the private mechanisms that exist for risk management.

Clearly there is great commercial potential in this area, and those who provide risk management services, such as commodity futures exchanges, are very well aware of the possibilities. It is interesting to note the general increase in interest around the world in the potential for expanded use of futures and options for risk management in agriculture. There are many technical issues to be faced, particularly where there is a general lack of experience with these mechanisms. There may be regulatory issues, particularly if the range and availability of contracts is to be expanded. Recently there has been an enormous increase in electronic commerce for agricultural products, particularly through the Internet. While much of this has focused on cash transactions, the use of the global information highway for trading in futures and options may not be far away. The opportunities for the globalization of risk management through new technologies are intriguing, but raise numerous issues, not least for national governments and market institutions.

How will importers cope?

As with so many aspects of modern life, conditions are changing rapidly in international grain markets. While we have not yet reached a "brave new world" of minimal government intervention, such a world may be in sight. This will be one in which market prices do the job of signaling scarcity or abundance and guiding the allocation of resources. Price variability is a natural part of market adjustment and a normal feature of efficiently functioning agricultural markets. In the main, government intervention has not been particularly successful in reducing such variability, or if it has, this has come at a considerable cost to the country concerned or to others affected by the results of its actions.

Poor countries that import significant quantities of grain on commercial terms may experience economic and social problems if prices rise too sharply. Their special needs were recognized in the Uruguay Round agreement and reaffirmed at the recent Singapore summit meeting of the World Trade Organization. In the short term, the world community can best cope with the implications for poor countries of allowing prices to work by using targeted assistance. In the longer term, the solution lies in addressing the root cause of food insecurity - poverty (Blandford and Viatte).

The world as a whole can best cope with unanticipated variability in prices due to the weather by working to ensure the full integration of domestic and international grain markets. This will require further reform of agricultural and trade policies to ensure true globalization and greater sharing of the burden of adjustment. Importers can best cope with the effects of such integration by facilitating the development of private mechanisms for risk management.

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THE ROLE OF RESEARCH IN THE OUTLOOK FOR WORLD FOOD[1]

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Modern science offers humankind a powerful instrument to assure food security for all without degrading the environment. Through enhanced knowledge and better technologies for food and agriculture, science has made major contributions to food security in recent decades. Food availability per person has increased by almost 20 percent since the early 1960s. There are 150 million fewer hungry people today than 25 years ago, and an additional 1.5 billion people in developing countries are being fed. The application of science through agricultural research has transformed food production in industrialized and developing countries. Higher yields and reduced risks have resulted in the production of more food at lower unit costs, higher farm incomes, and reduced food prices for the benefit of rural and urban poor people. Without effective use of science in agriculture, a large share of current forests would have been cut down and millions of hectares of land not well suited for agriculture would have been brought under cultivation with disastrous environmental effects.

In spite of past successes, hunger remains persistent at the threshold of the twenty-first century. Over 800 million people live in uncertainty of when or how they will get their next full meal, and 185 million preschool children suffer from seriously compromised mental and physical development because of malnutrition (FAO 1996). This situation is unconscionable, especially when resources are available to meet the food needs of each and every person in the world. Every man, woman, and child has the right to access to sufficient food to lead a healthy and productive life, whether that right is enshrined in official documents or not.

About 80 million people are expected to be added to the world's population every year for the next quarter century, increasing the world's population by about 35 percent to a total of 7.7 billion people by 2020 (UN 1996). With business as usual, global demand for cereals is projected to increase by 55 percent between 1990 and 2020 to 2.68 billion tons, for livestock products by 75 percent to 284 million tons, and for roots and tubers by 50 percent to 878 million tons (Rosegrant, Agcaoili-Sombilla, and Perez 1995). Developing countries, home to 98 percent of

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the increased world population in the next 25 years, are projected to increase their demand for cereals by 80 percent to 1.5 billion tons, for livestock products by 140 percent to 156 million tons, and for roots and tubers by 64 percent to 631 million tons.

Meeting these increased food demands will require global cereal production to grow at an average annual rate of 1.5 percent between 1990 and 2020, livestock production at 1.9 percent, and production of roots and tubers at 1.4 percent (Rosegrant, Agcaoili-Sombilla, and Perez 1995). In developing countries, cereal production will need to increase at an average annual rate of 1.9 percent between 1990 and 2020, livestock production at 3.0 percent, and production of roots and tubers at 1.7 percent, in order to meet increased food demands. Yield increases will have to be the source of most of the production increases; significant expansion of cultivable land is not an economically or environmentally sound option in most of the world. Cereal yields will have to increase by at least an average annual rate of 1.5 percent in developing countries and of 1.2 percent in the world as a whole, otherwise farmers will be forced to encroach on land unsuitable for agriculture, with devastating effects on the natural resource base.

Existing technology and knowledge will not permit production of the food needed to assure a food-secure world in the years to come. There are no grounds to assume that yield increases can and will continue to grow at the same rates as in the past. Significant research investments are required simply to maintain current yields. If research support is not sufficient, yields can not only cease to grow but may decline. Low-income developing countries are grossly underinvesting in agricultural research compared with industrialized countries, even though agriculture accounts for a much larger share of developing countries' employment and incomes (IFPRI 1995). Their public-sector expenditures on agricultural research are typically less than 0.5 percent of the value of agricultural output, compared with 1-2 percent in higher-income developing countries and 2-5 percent in industrialized countries. Low-income developing countries must increase their national agricultural research expenditures in the near term to 1 percent of the value of agricultural output, with a longer term target of 2 percent. National and international agricultural research systems must be mobilized to develop improved agricultural technologies and knowledge, and extension systems must be strengthened to disseminate the improved technologies and techniques. Interactions between public-sector agricultural research systems, farmers, private-sector research enterprises, and non-governmental organizations must be strengthened to assure relevance of research and appropriate distribution of responsibilities.

Research has a key role to play in maintaining and raising yields in more-favored areas where significant yield gains have already been achieved. In these areas, conventional plant-breeding approaches are reaching their limits in raising the biological potential of plants to give

higher yields, while misuse and overuse of agricultural inputs such as fertilizer, pesticides, and irrigation technology are leading to degradation of natural resources and consequent losses in agricultural productivity. Already, rates of increases in yields of rice and wheat have begun to slow under both experimental conditions and on farmers' fields (CGIAR 1995). Accelerated agricultural research is required to develop plants with greater tolerance or resistance to adverse production factors such as pests and diseases; to develop biological alternatives to chemical fertilizers and pesticides; to improve the use and quality of agricultural inputs such as irrigation technology; to improve crop management techniques; and to rehabilitate areas that have been degraded and restore their productivity to the extent possible.

The balance between less-favored and more-favored areas must be redressed. Although more-favored areas will remain a key source of expanded food production in the future and, by minimizing the need to exploit new lands, will help to reduce pressures on the natural resource base, a continuation of past low priority on less-favored areas is inappropriate and insufficient to assure sustainable food security. Less-favored areas — areas with limited and unreliable rainfall and fragile soils — comprise much of the cultivable area in many developing countries, are home to many of the world's food-insecure and poor people, and are subject to considerable degradation resulting from poverty, population pressures, and lack of agricultural intensification. Yields are low and variable in the less-favored areas. In order to reduce risks and uncertainties for farmers, accelerated research is required to develop crop varieties that are more tolerant of droughts and better suited to fragile soils and more diverse ecological settings. Research is also needed to reduce soil erosion, to capture and utilize more moisture in the soils, to generate and recycle organic sources of plant nutrients, to develop more diverse cropping systems, and to better integrate livestock and trees into cropping systems (Hazell 1995). Much more attention must be directed to the development of appropriate technology for the less-favored areas.

Investment in agricultural research is an important factor in assuring food security. Projections to the year 2020 suggest that, under the most likely or baseline scenario, the number of malnourished children in the world could decline to 155 million from 185 million today (Rosegrant, Agcaoili-Sombilla, and Perez 1995). However, should investments in international and national agricultural research significantly decline along with reductions in investments in education and health, projections indicate that the number of malnourished children could increase to 200 million in 2020. Alternatively, should national and international agricultural research systems be strengthened along with increased investments in education and health, projections suggest that the number of malnourished children could decline to 100 million in 2020. Scenarios to the year 2020 developed for China suggest that if the rate of growth in investment in agricultural research and irrigation were to increase from 3.5 percent a year to 4.5 percent, China

would shift from being a net importer of grain to a net exporter by 2020 (Huang, Rozelle, and Rosegrant 1997). Grain production would be higher by 36 million tons in this scenario relative to the baseline. However, if growth in investment in agricultural research and irrigation were to decline from 3.5 percent a year to 2.5 percent, grain production would decline by more than 50 million tons relative to the baseline and China's imports in 2020 would triple to 76 million tons from the baseline forecast.

Genetic engineering and other agricultural biotechnology are among the most promising developments in modern science. Used in collaboration with traditional or conventional breeding methods, they can raise crop yields or productivity, increase resistance to pests and diseases, develop tolerance to adverse climatic conditions, improve the nutritional value of foods, and enhance the durability of products during harvesting or shipping. Yet, with the exception of a very limited amount of work by the centers of the Consultative Group on International Agricultural Research (CGIAR), little research in agricultural biotechnology is taking place in or for developing countries. Most biotechnology research is occurring in private firms in industrialized countries, focuses on the plants and animals produced in temperate climates, and aims to meet the needs of farmers and consumers in industrialized countries. Low-income developing countries are constrained in their pursuit of agricultural biotechnology research by limited public- and private-sector funding and by shortages of trained personnel. They can address these constraints, however, by providing incentives to the private sector to engage in such research, by collaborating with international research programs, and by seeking private- and public-sector partners in industrialized countries. It is essential that agricultural biotechnology research that is relevant to the needs of farmers in developing countries and to conditions in those countries is undertaken, and that the benefits of that research are transmitted to small-scale farmers and consumers in those countries at affordable prices. Otherwise, developing countries will not only fail to share in the benefits of agricultural biotechnology, but will be seriously hurt as synthetic alternatives to their products are developed in industrialized countries, as is already happening with cocoa and vanilla.

A more fundamental constraint to the use of agricultural biotechnology in and for developing countries is the attitude toward risk among the nonpoor in both industrialized and developing countries. Considerable resistance to agricultural biotechnology has arisen on the grounds that it poses significant new ecological risks and that it has unacceptable social and economic consequences. Although no ecological calamities have yet occurred, some people fear that transgenic crops will develop troublesome new weeds or threaten crop genetic diversity. Of course, any new products that pose such risks should be carefully evaluated before they are released for commercial development. But by raising productivity and food production,

agricultural biotechnology will reduce the need to cultivate new lands and could therefore help conserve biodiversity and protect fragile ecosystems. To address concerns about ecological risks, developing countries can adopt regulations that provide a reasonable measure of biosafety without crippling the transfer of new products into the field.

As for the social and economic consequences of biotechnology, some people are concerned that large-scale and higher-income farmers will be favored because they will have earlier access to and derive greater benefits from agricultural biotechnology. These concerns are remarkably similar to those raised about the Green Revolution. Whatever the shortcomings, real or alleged, about the Green Revolution, it did avert widespread starvation and helped many millions of people escape hunger once and for all. Similarly, agricultural biotechnology can contribute to feeding many more people in a sustainable way. Appropriate policies can make new technologies accessible to small-scale farmers. Instead of rejecting the solutions offered by science, we should change policies to assure that the solutions benefit the poor.

If we are to produce enough food to meet increasing and changing food needs, to make more efficient use of land already under cultivation, to better manage our natural resources, and to improve the capacity of hungry people to grow or purchase needed food, we must put all of the tools of modern science to work. In a world where the consequence of inaction is death for thousands of children daily and persisting hunger for millions of people, we cannot afford to be philosophical or elitist about any possible solution, including agricultural biotechnology. Modern science by itself will not assure food for all, but without it the goal of food security for all cannot be achieved.

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WORLD FOOD SECURITY: A USDA PERSPECTIVE

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Last year, once again, we were visited by the ghost of Thomas Malthus. As 1996 began, headlines around the world warned of an imminent food crisis likely to spare no nation. It was a crisis, some said, that would dramatically inflate the rolls of the world's hungry and bring sharply higher U.S. food prices -- a crisis that could erode confidence in the new world trading system, push debt-ridden developing nations into bankruptcy, and exacerbate global tensions.

While much of the commentary was balanced, we were reminded often of the 200-year-old theory of Mr. Malthus suggesting that population growth would eventually outrun food production. Some of the articles early last year, quoting various experts, seemed to imply that the downward spiral had begun, the race was being lost, and that all the choices ahead were bad ones.

Not a pessimist by nature, I've never shared this view. I must confess that the gloom-and-doom scenarios remind me of a few lines from a humorous essay: "More than any other time in history," it goes, "mankind faces a crossroads. One path leads to despair and utter hopelessness. The other, to total extinction. Let us pray we have the wisdom to choose correctly."

Last year's would-be crisis never fully materialized. The ominous headlines faded as it became evident that grain producers around the world were responding to higher prices. Once again, the market system worked. Yet I don't want to make light of the serious challenges we face, or of those who regularly sound the alarm, reminding us of the consequences if we fail to address those challenges, reminding us of the uncertainties ahead, and reminding us of urgent needs still unmet.

Food security touches on the most basic and fundamental of human needs. In many parts of the world, the lack of food security is measured not in prices but in calories, in poor health, and in lives. It is the chronic malnutrition that millions of people suffer day in and day out. It is hunger and worse -- like we see in the continuing food crisis in the Great Lakes region of Africa, triggered by civil strife and exacerbated by poverty and failed economic policies.

If 1996 began with a threat, it ended with a promise -- a renewed international commitment at the World Food Summit in Rome to improve food security and reduce hunger. I will discuss the Summit, our view of where efforts should be focused, and the U.S. role in this global challenge. But, first, I want to set the stage by reviewing some of the trends and developments we see today that relate to global food security.

Trends and Developments Relating to World Food Security

Few subjects provoke more intense debate than issues related to hunger, whether one is discussing root causes and solutions or current trends and future projections. And trying to measure progress is sometimes like being on a train with the shades down: Although you know you're moving, it's not always easy to discern the direction.

Without doubt, we have a very long way to go to end hunger. But I think the evidence also suggests that the world has made some solid progress. Overall, global food production continued to grow faster than population during the last few decades. The 5.8 billion people in the world today have, on average, about 15 percent more food per capita than the world's 4 billion inhabitants had 20 years ago.

Of course, distribution is very uneven, and most people don't eat averages. Nevertheless, FAO estimates that the proportion of the world's people who lack food security declined from around 35 percent in 1969-71 to 20 percent in 1990-92 -- a decline made more impressive when you consider the rather significant growth in total population over the same period.

Despite the progress, an estimated 800 million people today still suffer from chronic hunger or malnutrition, with the greatest concentration in South Asia and sub-Saharan Africa. While the numbers are declining in Asia, those in sub-Saharan Africa are increasing. Currently, around a third of the population in sub-Saharan Africa is chronically malnourished.

Looking ahead, we can take some encouragement from the fact that growth in world population is slowing -- down to about 1.4 percent per year from a high of 2 percent or more in the 1960's and early 1970's. Fertility rates in developing countries have fallen a lot faster than anyone had predicted. If this trend continues, we are no longer talking about a doubling in world population over the next 30 or 40 years, as has so often been predicted. In fact, recent long-term projections of the U.S. Census Bureau suggest that global population may stabilize at somewhere in the range of 9 to 10 billion around the middle of the next century.

It is important to note that none of this means that population growth has ceased to be a concern. Even according to the recent projections, roughly a billion people -- another India -- will be added to world population by 2010. The world is currently growing by around 80 million people a year -- 80 million new mouths to feed. Almost all the growth is occurring in the lower income developing countries, many of which are net food importers.

Moreover, if population pressures are perhaps not as great as once anticipated, strong demand pressures are now being generated by rapidly rising incomes, especially in the developing nations of Asia, and by increasing urbanization as more people in developing countries leave the farms and migrate to cities. The growing taste for meat in developing countries puts substantial additional pressure on world grain production.

We can point to a similarly diverse mix of indicators on the supply side. We know that the rate of growth in world food production has slowed and that agriculture has become more dependent on yield increases as less new land is readily available to bring into production. We recognize the threat of environmental degradation and failure to adopt sustainable food production practices. FAO, for example, projects a substantial *potential* shortfall in the global supply of fish and seafood products by the year 2010 related, in large part, to overfishing and degradation of the aquatic environment.

On the other hand, we have all seen how easy it is to underestimate the production response when the market -- through prices -- signals the need for more output. And if there are some troubling signs for future food production increases, there is also the prospect of new productivity-enhancing technologies now entering commercial use, as well as the increased emphasis on sustainable food production systems and environmental protections around the world.

During the 20th century, at the global level, food production more than kept pace with demand. In general, food became more plentiful, as well as less expensive relative to income. Many believe this trend will continue into the 21st century, but we cannot summarily dismiss those who hold a more pessimistic view. Anyone looking for some certainty in economic projections is certain to be disappointed. As is often the case, the final conclusions usually depend on the initial assumptions underlying each study.

There is broad agreement that demand will grow and that developing countries, such as China, will continue to increase food imports. However, projections differ significantly on the magnitude of the increases over the next few decades and on whether the demand can be met by developed countries. Whatever the case, the view of a world moving from what has been characterized as an era of large surpluses into an era of growing demand was reinforced and given greater urgency by the rapidly tightening stock levels of late 1995 and early 1996.

If we agree that the world does not face an imminent food security crisis, we must also acknowledge that a number of developing countries are not so fortunate. Several countries now dependent on food aid are facing even more serious access problems in the foreseeable future. A recent USDA study projected a near doubling in total world food aid needs over the next decade just to maintain the current -- and often inadequate -- levels of consumption in some 60 food-aid recipient countries. The study points to a looming mismatch between food aid needs and food aid resources, especially in sub-Saharan Africa. Food aid availabilities today are the lowest in 20 years, reflecting severe budget constraints and reduced stock levels in the traditional donor countries.

The World Food Summit: Addressing the Challenges

These, then, are some of the challenges, concerns, and uncertainties that brought representatives from around 180 nations to the World Food Summit in Rome last November. Secretary Glickman led the U.S. delegation.

Speeches by heads of state, agricultural ministers, and others dealt with a range of issues. Some nations called for a reversal of the current trend toward declining levels of food aid. Others emphasized debt relief for poor countries, greater dissemination of agricultural research, internal agricultural policy reform, population control, and trade liberalization. Some expressed concerns about what they see as the uneven benefits of freer trade for poorer nations. Some participants were disappointed by the lack of an explicit commitment to "a right to food" -- a view shared by the nongovernmental organizations (NGO's) in their own forum on food security that ran parallel with the Summit.

Differences aside, the atmosphere was constructive, and there were few surprises. The most difficult task had been completed prior to the Summit. The Rome Declaration and the World Food Summit Plan of Action were negotiated in advance and then approved by acclamation in the opening session.

From the U.S. point of view -- a view I think widely shared -- the Summit was a good start. First, it focused needed attention on those who suffer chronic hunger and malnutrition around the globe. Nations undertook a renewed commitment to alleviate hunger, setting as a goal the reduction, by half, in the number of people currently suffering from undernutrition no later than the year 2015. Some of you may vaguely recall the groundbreaking 1974 World Food Conference, where participants set a goal of eliminating hunger and undernutrition within a decade. The new goal still represents a very ambitious challenge, but it is more realistic -- it seems reachable.

Equally important, the Summit Plan of Action helped define the steps that are needed to improve food security and reduce hunger, taking a comprehensive approach that requires actions by both developing and developed nations, as well as by the international community and multilateral institutions.

Without listing all the recommended actions, I want to focus on three areas addressed in the Plan of Action that we believe deserve particular attention:

- The adoption of appropriate policies by developing countries.
- Increased emphasis on research and new technologies, including policies encouraging the transfer and use of these technologies in the developing world.
- Continued recognition of the central role of trade and market-oriented trade expansion, coupled with efforts to ensure that the benefits of freer trade are widely shared.

First, we believe that food security can only be achieved with appropriate policies within individual countries. Food-importing developing countries can get help from outside, but their problems cannot be solved from outside. Leaders in these countries need to enact the internal policy reforms necessary to release private sector initiative and help pull their countries out of poverty and dependence.

Many battles have been won in the struggle against hunger over the last two decades, and we have learned what kinds of policies are conducive to economic development, external investment, and increases in agricultural production. For example, we know that economic policies should facilitate efficient markets, rather than attempting to substitute government action for markets. This mean, in part, passing real prices back to producers in an economy linked to global markets. Governments should work to sustain a stable economic environment that encourages full participation by the private sector, and should invest in infrastructure, education, and social safety nets. Institutions and land tenure systems should provide incentives for land users to protect and enhance the long-term productivity of natural resources. General development policies should be established that do not discriminate against the agricultural sector or rural areas.

We know what policies have worked, and we have seen the results in Asia and Latin America -- even in a number of least-developed countries with a legacy of past problems. For example, since the end of civil strife and with the help of structural reforms, the food supply situation has improved markedly in Ethiopia, Mozambique, and Uganda. Food security does not come from a few high-income countries accumulating massive stocks as a result of misguided domestic policies. It does not come from misguided policies of self-sufficiency in developing or developed countries. The countries that have demonstrated the most progress in achieving economic development and food security are those that have seriously pursued market-oriented policy reform.

Food aid is still needed. Technical expertise and developmental assistance is needed. The wealthier countries and the multilateral development banks should assist those countries that demonstrate the political will to enact market-oriented reforms and restructure their own national food and agricultural policies. The fact that so many countries are pursuing structural adjustments in their economies and agricultural sectors today is a very positive sign.

Second, we believe future food security depends on continued and even stronger emphasis on agricultural research and development at the national, regional, and international level. And this must include policies that encourage the transfer to and the use of new technologies in developing countries. The "green revolution" of the past may have run its course, but new developments hold great promise. Early results in the emerging field of biotechnology are especially encouraging. Right now, researchers are revolutionizing agriculture by finding new ways to increase yields, improve disease and pest resistance, adapt crops to different growing conditions, and promote sustainable agricultural development with reduced use of pesticides.

New corn varieties emerging from biotech research that resist both drought and acidic soil could feed an additional 50 million people a year, according to the Consultative Group on International Agricultural Research (CGIAR). Among other projects, USDA scientists are working on a carrot that is three to five times richer in vitamin A, so that a few cents worth of seed on just a square meter of land could potentially provide 100 percent of a person's annual need for the vitamin.

Almost all the gains in food production over the last 20 years have come from genetically improved crops. Biotechnology is a tool that allows researchers to shorten the time it takes to produce new plant varieties from a decade or more to just a few years. High-yielding varieties can be more quickly developed, and natural pesticides and resistant traits can be genetically engineered into crops. An estimated one-third of the world's crops are now lost each year to insects and plant diseases.

Nations need to work together to ensure that the benefits of the new technologies are not lost in a maze of restrictive and unnecessary regulations. While safety must always be the primary consideration, sound science should be the guide. Theoretical risks that lack foundation must be balanced against the real risks of not taking advantage of the benefits that new technologies may offer. In the case of biotech foods, these risks may fall disproportionately on the world's poorest nations. People should not be asked to go hungry for want of a higher yielding variety of corn, when all the evidence tells us it is as safe to produce and consume as any traditional hybrid. Developed and developing countries alike need to take advantage of these new scientific tools that will help producers safely feed a growing world.

The importance of increasing-productivity through technology is illustrated by USDA projections for sub-Saharan Africa, the most serious case in the world today. In that part of the world, a doubling in the projected rate of increase in grain yields over the next 10 years could cut the region's food aid needs by half and reduce global food aid needs by 25 percent.

Third, we believe that trade liberalization is one of the most critical, most fundamental, keys to greater world food security. U.S. efforts helped ensure that this view was incorporated as one of the core commitments in the Summit Plan of Action.

How Trade Liberalization Enhances World Food Security

Food security can be seen as a combination of several components. One, of course, is production, including the amount and composition of agricultural products produced around the world. But production is not enough. In the past, we often had large food surpluses in a few countries existing side-by-side with severe shortages in others. Another component is access to the food being produced -- the distribution of food around the world. Freer trade addresses both factors.

A fair, open, market-oriented trading system is best suited to aligning supply with demand, maximizing output over time, and reducing wide swings in production. When real prices are passed back to growers, this encourages production where countries are competitive and provides the incentive for growers to produce what the market demands. It facilitates the efficient movement of capital and resources into sectors where demand is rising. It discourages wasteful policies of self-sufficiency. And it tends to unleash the initiative and ingenuity of millions of farmers and agriculturalists worldwide.

In terms of access, freer trade provides importing countries with a wider choice of suppliers and allows them to take full advantage of the world market to make up for shortfalls in domestic production. The variability of production is almost always lower at the global level than it is at the country level.

Of course, freer trade involves obligations. It requires that food exporting nations remain consistent, reliable suppliers. Export embargoes and taxes undermine the foundations of an open market. Importing countries also have an obligation. If farmers in exporting countries are going to rely on market signals to determine what and how much to produce, those signals should not be interrupted or distorted. Exporters need to know the markets will be there -- they need reliable buyers and buying patterns they can count on. Communication, consistency, and predictability are crucial to an efficiently functioning market that responds to consumer needs.

Although the trade policy reforms of the Uruguay Round are still being implemented -- although further steps need to be taken in the next round of agricultural trade negotiations -- we can already see evidence that market-oriented trade policy reforms within and among countries are working. The evidence is found in the dramatic response of growers around the world to the tight grain stocks and higher prices that generated so much renewed concern about food security.

Global wheat and coarse grain production for 1996/97 is forecast at 1.47 billion metric tons, the highest production level ever recorded. This year's output is expected to be up 134 million tons from last year, the second largest year-to-year increase ever. More importantly, global grain acreage is up 17 million hectares in 1996/97, a remarkable turnaround in light of the steady decline in planted area during the last 20 years.

Recent gains are not confined to grains. Livestock consumption worldwide continues to show dramatic growth, reflecting not only higher incomes but also increased productivity. Since 1992, global consumption of beef, pork, and poultry meat is up 17 percent -- nearly twice the increase in population. Likewise, trade in processed and other consumer foods is virtually exploding.

Price signals communicating market demand are reaching the world's producers, and they are responding by increasing production. It is true that tighter grain stocks have raised questions about market stability and the potential for greater volatility in production and prices. However, market-oriented policies and freer trade can substantially reduce this risk if demand signals are quickly and clearly communicated to the marketplace. Does anyone believe that the risks of market volatility are any less if exporting nations can turn on or shut off exports at will, or if large government-monopoly importers can disrupt markets at any time for any reason?

Nations need not fear freer trade from a food security standpoint. In a world where trade flows freely across borders, food security is not constrained by the limitations of self-sufficiency. It is not measured by food aid budgets. It is not a function of how much each nation produces, but rather of global production, freedom of movement in products, and affordability -- the ability of developing and developed countries alike to buy the food they do not produce year after year.

And it is in this last area that trade liberalization appears to offer the greatest long-term benefits. For the United States, for Japan, for Europe, for dozens of fast-emerging developing countries today, trade expansion has proven to be an engine for economic growth. It has spurred rapid development and generated rising incomes in countries once mired in poverty.

At the beginning of this year, The Washington Post ran a series of articles exploring some of the impacts of the growth in international trade and investment in a world where borders are no longer barriers. One of the articles, titled "Free Trade Helps Lift World's Poor," talked about what happens when free trade is combined with a receptive investment climate, a good infrastructure, and a stable political and economic environment. It pointed to the hundreds of billions of dollars pumped into developing countries by private companies and investors, lifting entire countries and literally millions of people in the developing world out of poverty. It took note of how economic growth in developing countries can benefit all nations, providing new markets, new opportunities, for developed and developing countries alike.

While the series highlighted the Asian miracle, it also examined the other side -- the lingering poverty in sub-Saharan Africa and the unequal distribution of the benefits of development in many nations. If some nations and some people within those nations continue to prosper while others languish behind, the result will be a growing gap between rich and poor.

This is why it is so important that developing countries undertake internal policy reform and create a stable political and economic environment that widely distributes the benefits of growth and provides a safety net for their citizens. This is why it is important that development assistance be used, where possible, to encourage market-oriented reforms and the building of infrastructure and human capital. And this is why developed countries should not pursue policies which send the wrong signals to their own producers or distort international trade flows.

In supporting a fair and open trading system, we are seeking not only a more prosperous America, but a freer, fairer, and more prosperous world. The vision that launched the Uruguay Round remains our vision today, and it goes beyond the significant direct benefits to the U.S. economy and U.S. agriculture. It is a belief that freer trade is a means of raising living standards worldwide, promoting sustainable economic growth and development, and contributing to closer, stronger, and more stable international relations. It is the recognition that freer trade and open markets encourage and foster freedom in other areas as well. It is the conviction that in an increasingly interdependent world, freer trade provides the best assurance of food security for all nations.

Certainly, freer trade does not solve all problems, but it is far better than the alternatives. The benefits of freer trade are greatest when all nations are participating, and all nations are contributing. It is not in our interest to see nations left behind. Coupled with internal policy reforms, development assistance, support for agricultural research, and food aid where needed, freer markets can contribute substantially to a more food-secure community of nations.

By embracing these objectives, the World Food Summit Plan of Action provides what we believe is a solid, well-balanced set of recommendations that can be useful to individual nations and the international community in addressing the problems of hunger and food security. But the Summit was only a start. The full measure of its contribution -- its ultimate success -- will depend on the political will that countries demonstrate, individually and in concert, in the followup this year and over the years to come.

U.S. Role and Stake in Enhancing Global Food Security

The United States has long been a leader in building a more food-secure world, and we will continue to play a leadership role in the followup to the Summit. As Secretary Glickman said at the Summit, "The United States shares the belief that hunger is a fundamentally unacceptable human condition, whether it exists on American soil or anywhere in the world."

But a food-secure world is also very clearly in our own interest. U.S. agriculture, the U.S. economy, and U.S. security are tied to the global community of nations. Both agriculture and the U.S. economy as a whole are increasingly dependent on trade. Moreover, a world in which 800 million people lack adequate nutrition is not likely to remain a peaceful or stable world.

By any measure, the U.S. contribution to world food security is unmatched. The United States is the world's leading exporter of food and farm products, supplying an estimated 23 percent of the total value of world agricultural trade. We are committed to being a reliable supplier. This past year, despite very tight grain supplies, despite the actions taken by the European Union, and despite internal pressures, the Secretary announced that there would be no restrictions on exports. We stood our ground, despite all the pressures. We even opened up our food security grain reserve to ensure that wheat would be available to hungry nations in need of assistance.

The 1996 U.S. farm law reinforces the U.S. commitment to be a reliable supplier -- to respond to the demands of the global marketplace. As a result of the new law, farmers are free to react to market signals and to determine what area to plant to what crops. We saw the response to some extent in this first year, and we'll see it even more in the future. In the new global trade environment, reliability of supplies is a commitment that must be shared by all food-exporting nations, just as reliable market access is a responsibility that all food importers must recognize.

The United States also has a historical commitment to food aid, development assistance, and support for international agricultural research and the international financial institutions. These efforts will continue.

As part of U.S. preparations for the World Food Summit, a food security policy paper was developed that outlines eight broad areas where the United States intends to focus its efforts toward improving global food security and reducing hunger. Among these are encouraging the adoption of market-oriented agricultural and food policies; supporting agricultural research and technology development at home and abroad; maintaining the global momentum toward freer

trade and ensuring that the benefits are equitably shared; maintaining the U.S. commitment to provide food aid and developmental assistance where needed; and supporting multilateral efforts to improve food security.

We will continue to provide developmental and technical assistance, using that assistance wherever possible to encourage and support the efforts of developing nations to implement market-oriented policy reforms. An investment in economic and agricultural development is an investment in future trade. We know from long experience that as agriculture improves and brings higher incomes in developing countries, diets change and imports increase. Developing countries take nearly half of U.S. agricultural exports and they represent our fastest growing markets. Economic development is market development.

We recognize that food aid will always be needed because of natural disasters, drought, civil strife, and unforeseen and often unavoidable events. The United States remains the world's leading supplier of official food aid, and private donations by Americans for emergency food distribution and other international relief are even greater than U.S. government aid. We will continue as a leading contributor to food aid efforts.

As aid budgets in the United States and other traditional donor nations shrink, we are also working with other countries to fully implement the Marrakesh Decision, which was one of the Uruguay Round agreements signed in April 1994. This decision recognized that some of the poorer net-food-importing countries may experience short-term difficulties in acquiring adequate food supplies as trade reforms are implemented. It recommends a number of actions to assist those countries, including efforts by individual developed countries and development banks to provide the technical and financial assistance needed to improve agricultural productivity and infrastructure.

The Marrakesh Decision also urges negotiations toward ensuring that adequate food aid is provided where most needed. Discussions have now begun under the Food Aid Convention to consider ways of expanding the list of food aid donor nations and the list of products that can be pledged. In recent years, we have seen countries such as Japan playing a more active role in food aid, and it is appropriate that a number of countries now enjoying a new-found prosperity should assist in this global effort. We also foresee a greater role for the private sector, both in anti-hunger and development efforts. We cannot end hunger solely on a government-to-government basis. The capital, resources, and expertise of the private and nonprofit sectors are needed.

Planning is already underway to move forward in implementing the U.S. commitments outlined in our policy paper for the World Food Summit and in the Plan of Action endorsed at the Summit. These efforts are being coordinated by the Interagency Working Group on Food Security (IWG), which is co-chaired by USDA, AID, and the Department of State. Following the Summit, the IWG agreed that the next major step would be the development of a long-term U.S. action plan on food security, with both international and domestic components. In formulating this plan, we will seek broad non-governmental participation. This is to be a U.S. action plan; not just a U.S.

government action plan.

An advisory committee on food security will be established, which includes representation from all non-governmental sectors that contribute to food security. A major conference is also being planned for this spring, tentatively scheduled for May. The purpose will be to deal with the entire range of Summit followup issues and to help develop the U.S. action plan, defining appropriate roles for government, the nonprofits, the private sector, and society at large.

We have had initial consultations with the interested NGO's and private sector representatives about the conference and the development of the U.S. action plan. We hope to have a first draft of the plan completed by late summer.

At the same time, at the multilateral level, we will continue the discussions on food security issues and implementation of the World Food Summit Action Plan in various multilateral fora, including the UN, FAO, WTO, and OECD. This must be a global effort.

Finally, we will continue to aggressively pursue the trade liberalization agenda. As I have already noted, we believe that a fair and open trading system is the best way to ensure stable, affordable food supplies throughout the world -- for consumers of all nations. Freer trade provides the incentive and opportunity for producers everywhere to respond to market demand in an open trade environment, without import bans or export embargoes.

Conclusion

In his recent State of the Union address, President Clinton spoke about the challenges we face as a nation in preparing for the 21st century. He said, "We face no imminent threat, but we do have an enemy -- the enemy of our time is inaction." This also applies to the challenges we face in global food security.

The world will enter the 21st century -- the new millennium -- with some 800 million people going to bed hungry or malnourished. If, as a global community, we succeed in meeting the goal set at the World Food Summit, that number will drop to around 400 million by 2015. Of course, 400 million people without adequate nutrition is still far, far too many, but it would be a substantial accomplishment, an unprecedented achievement. Based on the current population projections for those years, it would mean a drop from roughly 14 percent of the world's people in this predicament to around 5-6 percent.

Success in this effort will require an unprecedented and concerted global commitment. It will require that food-insecure countries "get their policies right." It will require continued trade liberalization and the development, transfer, and adoption of new, safe productivity-enhancing agricultural technologies. It will require actions to protect natural resources and reduce environmental degradation and loss of productive lands and forest. It will require the peaceful settlement of disagreements, rather than armed conflict, as well as continued efforts to stabilize

populations and eliminate gender discrimination. And it will require economic growth, stimulated by freer trade, market-oriented internal policies, and developmental assistance -- growth that brings higher incomes and reduces poverty.

It is a tall order, a formidable challenge, but we do not see it as impossible. What we cannot afford is complacency and inaction.

There's a story you may have heard about the difference between heaven and hell. In hell, each person has a dish of food and a spoon -- but these are very long-handled spoons. There's a lot of turmoil and chaos as each person fights for room to get the spoon from dish to mouth. So long and awkward are these spoons that people just can't reach their mouths. In the jangle and clash of silverware, food is spilling, everyone is bickering, and no one is getting much to eat. In heaven are those very same plates of food and the same long spoons. But it's a calm and convivial scene, with everyone getting a taste of everything and everyone well fed. The difference is that the people around the table are using those long spoons to reach across and feed each other.

The world has made progress in reducing hunger, and I believe this progress can continue. For humanitarian reasons, economic reasons, security reasons, it is in everyone's interest.

INTRODUCING USDA'S DOMESTIC AND INTERNATIONAL PROJECTIONS TO 2005

Gerald A. Bange, Chairperson
World Agricultural Outlook Board, USDA

Welcome and good morning, my name is Jerry Bange, Chairperson of the World Agricultural Outlook Board. I am pleased to moderate this morning's session entitled: "USDA's Domestic and International Projections to 2005"

The projections you are about to see and hear are the highlights of USDA's long-term baseline. Let me start with a few brief remarks about USDA's baseline program. This is the third year we have released the baseline at the Forum. Last year, ERS presented a pre-Forum seminar which highlighted USDA's international baseline -- this presentation proved to be extremely well-received. This year, the program committee elected to make the USDA baseline a formal part of the program.

What is USDA's Baseline?

Simply stated, USDA's baseline is a set of long-run, policy-dependent projections. USDA's baseline is not a "forecast" in the traditional sense of the word. Few analysts, particularly those who worked on this baseline, would say with great confidence that wheat prices will average $4.80 per bushel 9 years from now. Yet, this number is in the baseline.

Baseline estimates are not presented as forecasts. Rather, they are intended to outline the path the agricultural sector will take under a given set of assumptions.

The baseline projections you will hear today reflect current law, a specific set of macroeconomic assumptions, a continuation of current agricultural policy and "normal" weather - no shocks to the system are assumed. From a traditional forecasting perspective, it is this "no shocks" assumption which most differentiates the baseline from a forecast. Few analysts would accept the notion that unforeseen changes will not occur sometime during the baseline period.

Why Does USDA Need a Baseline?

USDA needs a baseline because unexpected events will occur. USDA must be proactive, not reactive, if it is to perform a useful function. The Department must anticipate change, evaluate the impact of that change, and be prepared to act as appropriate.

As an interagency product, the baseline is used Department-wide for a variety of purposes. For example:

- It is used to develop the President's budget
- It is used to analyze alternative policy scenarios.
- It is used to perform sensitivity analyses, e.g., What is the impact of an expanded EU? Or, what is the impact of rapid economic growth in China?

How Is the Baseline Produced?

All USDA agencies with expertise relevant to the baseline participate in the process. While the baseline is an interagency product, it is largely the work of the Economic Research Service. As Chairperson of the Projections Committee, I get a first-hand view of the hard work ERS puts into the baseline. The interagency clearance process is extremely tedious. Through it all, ERS exhibits great skill and tenacity.

Now let's begin today's program ...

USDA's 1997 Baseline: The Domestic Outlook

By Katherine R. Smith
Director, Commercial Agricultural Division
Economic Research Service, USDA

The complex global picture painted by USDA's international outlook, covering the 1997-2005 period, has obvious implications for the welfare of a wide range of stakeholders in U.S. agriculture. Because of the diversity and interdependence of different parts of U.S. agriculture, it is rare when an outlook scenario suggests that ***everyone*** is well off or better off. Typically, if grain prices are high (a good outlook for grain producers), livestock producers are likely to be hurt. Or if prices received by farmers for livestock products are high, consumers are worse off due to higher retail meat prices.

Tradeoffs across subsectors and market participants are the rule. However, this year's domestic outlook reflects the ***exception*** to that rule. Some main features behind this optimism over the outlook period are presented here.

Crops sectors in general. Strong growth in use leads to rising prices and greater areas planted to most major field crops. The U.S. specialty crops sectors also thrive. The U.S. becomes a net exporter of fruits by 2000.

Food and feed grain. In the near term, prices drop from the abnormal highs of recent months, but the outlook over the longer term is for a slow rise in prices. The USDA baseline assumes that CRP acreage drops temporarily as contracts expire, but then rebounds quickly to over 36 million acres. Most land enrolled in the CRP will be in areas traditionally planted to major field crops. This, together with strong world demand, pushes grain prices up.

Oilseeds. USDA's baseline incorporates an expectation of big productivity gains in soybeans and other oilseed crops in the U.S., maintaining a U.S. edge over other major producing countries. These gains in U.S. productivity and efficiency lead to lower production costs, leaving the U.S. well-positioned to meet the strong growth in demand we see for the oilseed sector.

Cotton. Yield and acreage gains provide the cotton production to meet the strong growth in demand, particularly domestic demand, we expect over the next decade. For cotton to successfully compete with other crops for more acreage, cotton prices will have to follow those of grain and oilseeds.

Meats and livestock. The price situation is similar to that for crop prices--moderate growth in nominal terms with real prices dropping. While feed prices are now dropping to more normal levels, over the longer-term they will rise at rates similar to the general inflation rate. As a result,

livestock producers do not experience any real (inflation adjusted) increase in feed prices. At the same time, increases in feed efficiency and other production and marketing efficiency gains (especially for hogs, broilers, and feeder cattle) should lower real livestock production costs. The net result is that efficiency gains offset real price declines and livestock producers' income remains stable in real terms.

Farm income and wealth. It is not surprising from the commodity specific highlights just reviewed that our farm income outlook is also quite rosy. Net farm income, in nominal terms, is expected to rise steadily over the projection period. Transformed by inflation adjustment, this means that we are expecting a steady real farm income situation--a definite change from recent trends. Given the conditions and assumptions on which this baseline relies, the debt-to-asset ratio remains flat beyond 2000. Debt is expected to rise, but is offset by rising asset values.

Consumers. Food inflation grows slower than general inflation, even though disposable income spent on food is influenced by a continued trend of substantial purchases of food away from home.

In summary, just about everyone is better off: farmers, whether crop producers or livestock producers, and consumers. What factors interact to create such a rosy, but atypical projection?

EXPLANATORY FACTORS

Strong export growth, the product of robust world economic growth and factors such as trade liberalization, is a key part of the projection scenario. U.S. exports rise from this year's forecast of $56 billion to $80 billion by 2005. High-valued product (HVP) exports increase faster than bulk exports. In particular, the farm value of meat exports rises significantly over the projection period. The export share of total U.S. use grows significantly for corn, grows slightly for wheat and soybeans, and drops for rice and cotton (which experience rapidly growing domestic demand).

Domestic policy and policy assumptions support a positive agricultural outlook. The planting flexibility introduced by the 1996 farm act facilitates the market's response to changing demand for U.S. agricultural commodities. In addition, the baseline assumes that production flexibility contract payments continue beyond expiration of current legislation in 2002. This helps to explain why crop producers are better off, in the aggregate, despite lower real prices. Still, government payments are becoming less important over time as a ***proportion*** of gross cash income.

Trade agreements and unilateral trade policy reform in other countries allow U.S. farmers to better realize competitive gains from their comparative advantage in many agricultural products, while reinforcing the advantages of freedom to respond to market signals.

Structural change in U.S. agriculture, via consolidation and concentration, continue and provide economies of scale that increase efficiency above and beyond technology change. In addition, the increases in vertical coordination of activities in the food production and marketing chain, for example, help to explain why the consumer is better off with respect to food prices.

In creating a baseline scenario that takes recent trends into account and builds on recent policy actions, USDA is not saying that the "everyone wins" outcome will truly come to pass. The baseline is not a forecast! For example, by assuming that production flexibility contract payments continue, we are not forecasting that they will. We are simply saying that, since we don't know what future policy will be, we are assuming no change. Also, any number of other things might happen that could greatly alter the actual outcome. By making our assumptions clear, users of the baseline can adjust the projections if they want to use different assumptions.

BASELINE UNCERTAINTIES

Weather, as always, is the real wild card. But several other factors play an important role in determining the eventual outcome of the U.S. agricultural sector.

Government policy, can take almost as many wild turns as weather. USDA's baseline assumes no change in current U.S. agricultural policy beyond 2002. This is not necessarily what we expect. But it is hard to know ***what*** to expect, even with respect to domestic policy in the near term.

Unilateral foreign policy change is another big source of policy uncertainty. For example, the EU could establish larger set-aside rates under CAP reform than we have assumed.

Multilateral or regional trade agreements could have a lot to say about future directions. Whether what they have to say bodes well or poorly for various U.S. stakeholders is dependent upon the nature of any agreements' growth and development. For example, EU enlargement ***could*** significantly decrease export demand for some U.S. agricultural commodities and food products. But, accession to the WTO of a few major countries such as China could expand U.S. market access by increasing the number of countries who are playing by the same international trade "rules" as we are.

Strong income growth in developing economies is a major reason for the optimistic scenario outlined by the international baseline. Weaker growth would mean lower global trade, U.S. exports, and prices.

Supply response, both domestic and international, determines the agricultural sector's performance in responding to market signals. Yield assumptions in this baseline have not been altered to account explicitly for changes that could occur as a result of biotechnological breakthroughs. In addition, potential productivity changes that may result from the 1996 farm act are excluded, principally because a good deal of uncertainty remains about how domestic supply is going to respond in the absence of acreage reduction programs and deficiency payments.

Finally, there is even greater uncertainty about the nature of foreign supply response. Experience in the recent past suggests that foreign supply is highly responsive to price signals, and can adjust more rapidly than previously expected.

Energy prices. There appears to be an upsurge in general concern about energy price stability over time. There is no empirical basis, though, for assuming a new energy crisis or anything other than a trend extension for energy prices in our baseline. If wrong, though, energy price instability could have a big impact on the outlook

Stocks and food security. U.S. and global grain stocks-to-use ratios in the baseline scenario are tight by historical standards. What this means for the outlook with respect to price volatility and food security remains uncertain. On one hand, a range of factors suggest that stocks have become less important to price stability. Such factors include globalization of markets, trade and agricultural policy liberalization, and advances in telecommunications (allowing electronic trade and linking foreign and domestic futures markets). On the other hand, price levels are inversely related to levels of stock and, as stocks decline, higher prices might make food security harder to assure in low income countries.

In addition to the above uncertainties, the baseline-derived outlook says nothing about a variety of issues--e.g., income risk management and sustainability--that are currently central to the domestic agricultural economy. Greater farm income variability is expected as a result of the 1996 farm act's removal of traditional income safety net mechanisms. U.S. farmers will have to make strategic use of risk management alternatives. The baseline cannot tell us which of these mechanisms farmers will adopt, or what their adoption will mean for such things as production or average income levels in the medium term.

The economic, ecological, and social sustainability of the conditions underlying the baseline exercise (or implied by the resultant outlook) cannot be gleaned from the information at hand. Nevertheless, considerations of sustainability (or lack thereof) introduce more uncertainty about whether pathways suggested by the current outlook can be maintained over time.

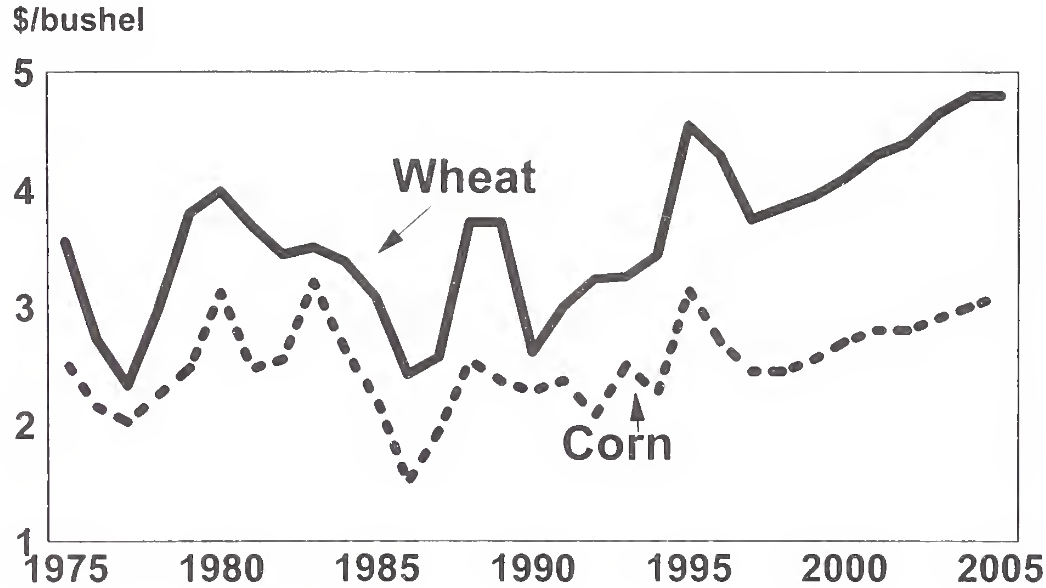
It is important to remember that the baseline is a "conditional scenario analysis," designed for comparative purposes. Whether or not an individual agrees with the underlying assumptions, the baseline serves as a transparent reference tool from which alternate outcomes may be derived by changing those assumptions. To help you make the choice of how USDA's 1997 baseline estimates through the year 2005 might help you or your firm, you are invited to take a look at the baseline projections on the internet at **http://www.mannlib.cornell.edu/data-sets/farms/94005/**.

USDA Baseline Projections to 2005

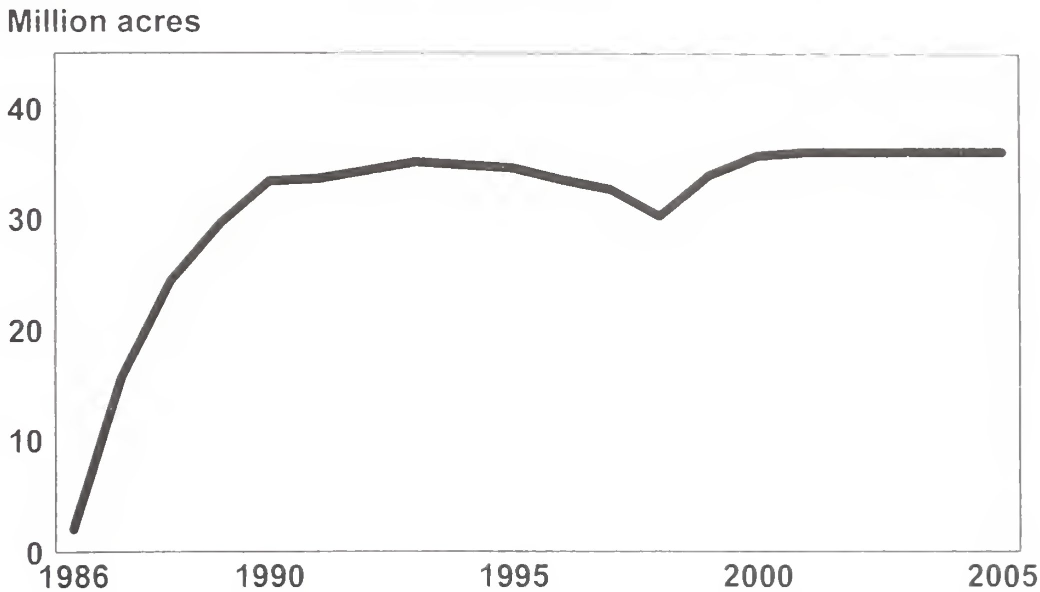
U.S. Highlights

Katherine R. Smith
Economic Research Service
U.S. Department of Agriculture

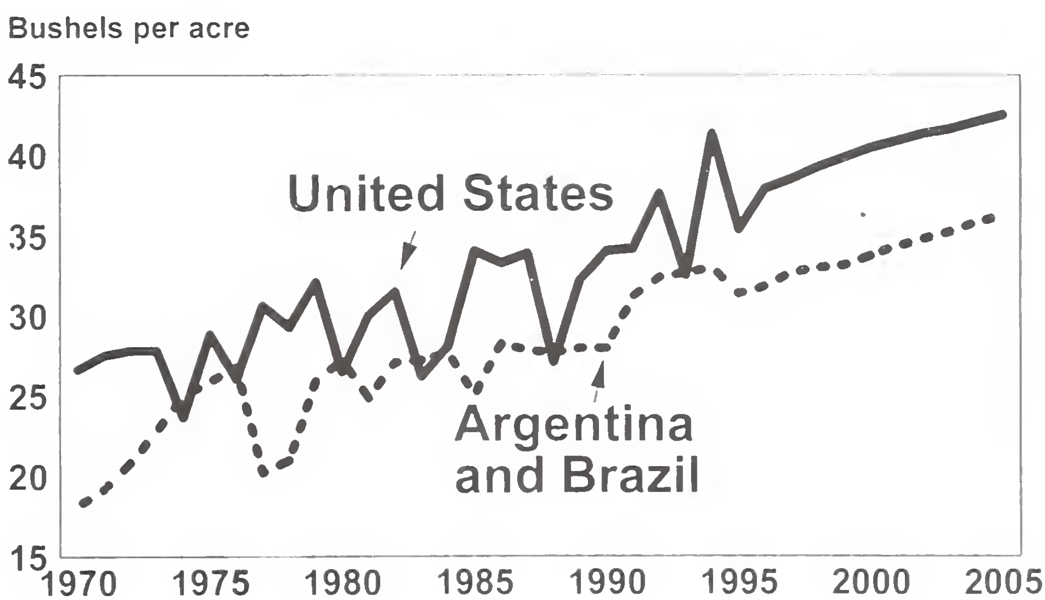
Nominal Crop Prices Grow



Conservation Reserve Program Acreage Projected to Drop in 1997 and 1998 and Then to Rebound



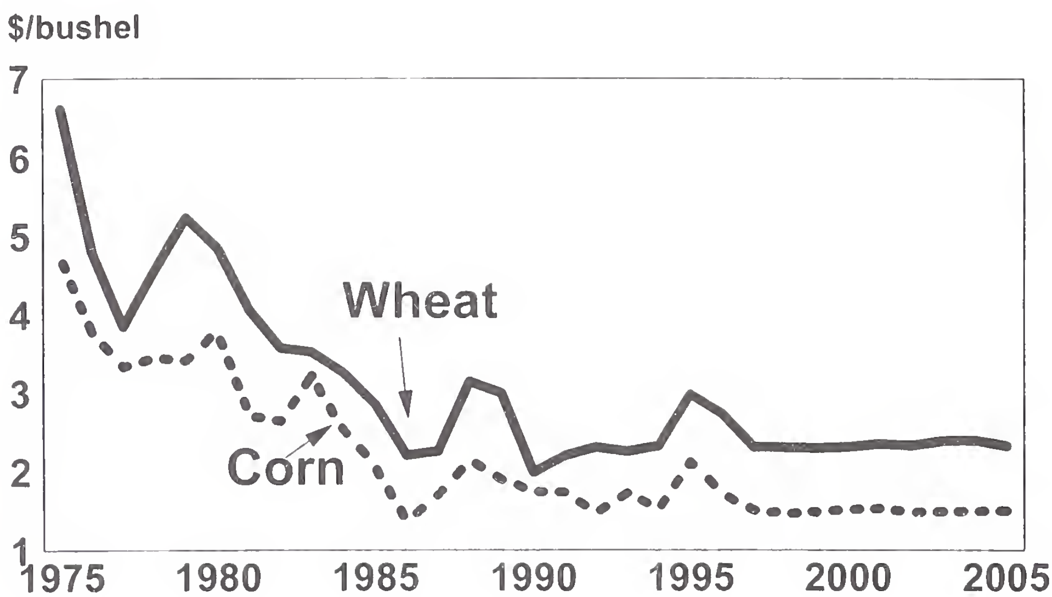
Soybean Yield Growth



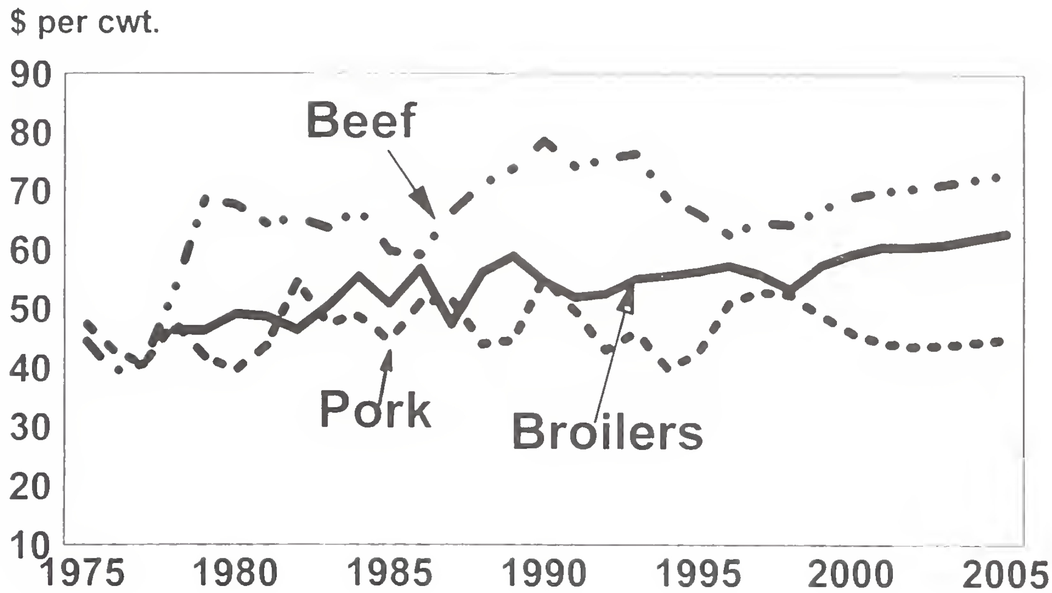
U.S. Baseline Crop Supply and Use Growth

	1991-95 to 2005 Annual Growth Rates		
	Use	Yields	Planted Area
		Percent	
Wheat	1.2	0.6	0.9
Corn	2.1	1.5	0.7
Soybeans	1.6	1.3	0.3
Rice	0.5	0.6	-0.3
Cotton	1.4	1.2	0.1

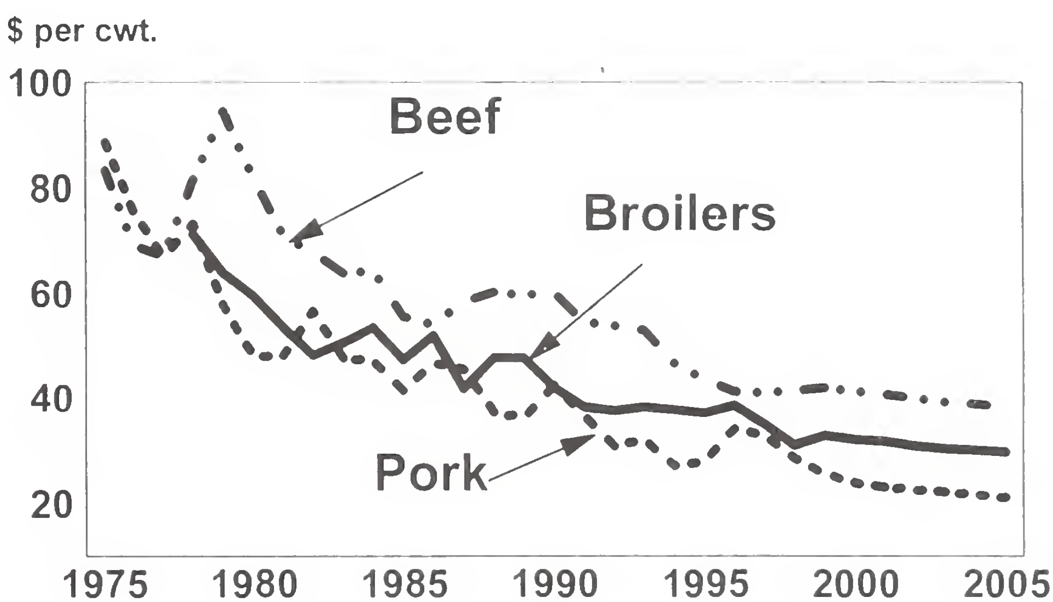
Real Crop Prices Level Off



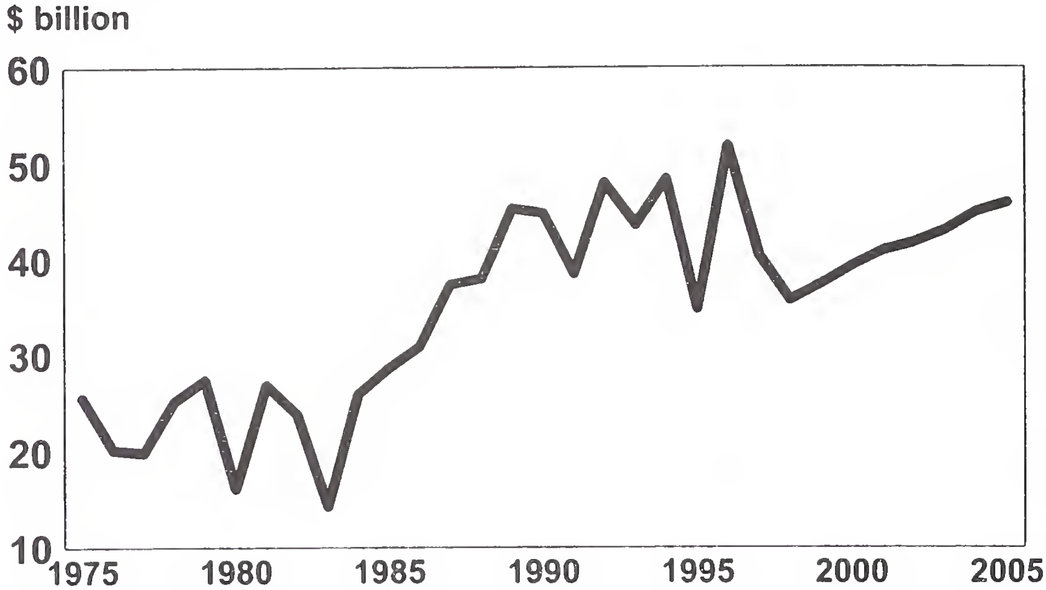
Nominal Livestock Prices Grow Moderately



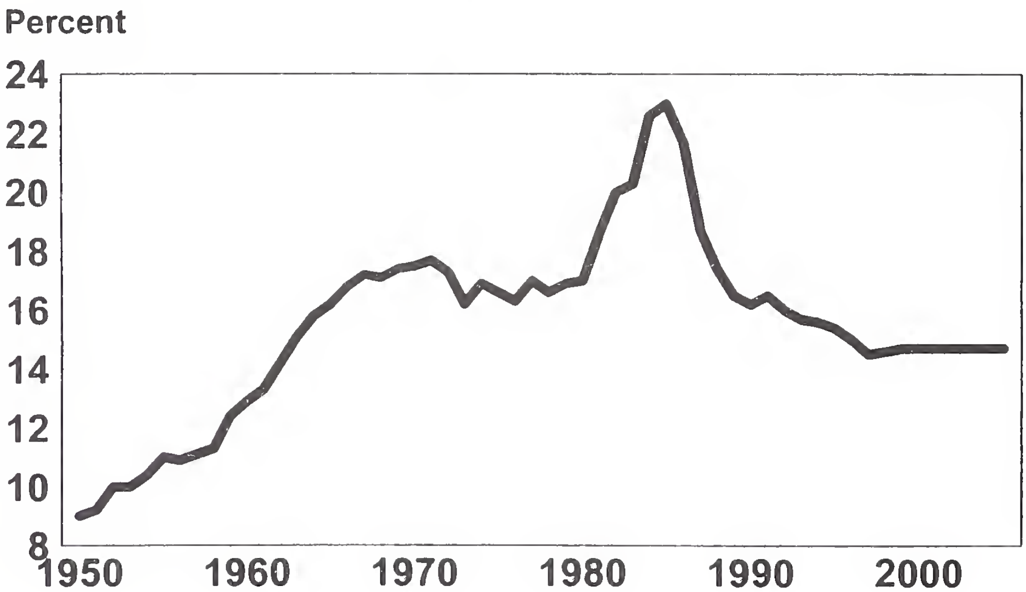
Real Livestock Prices Continue to Drop



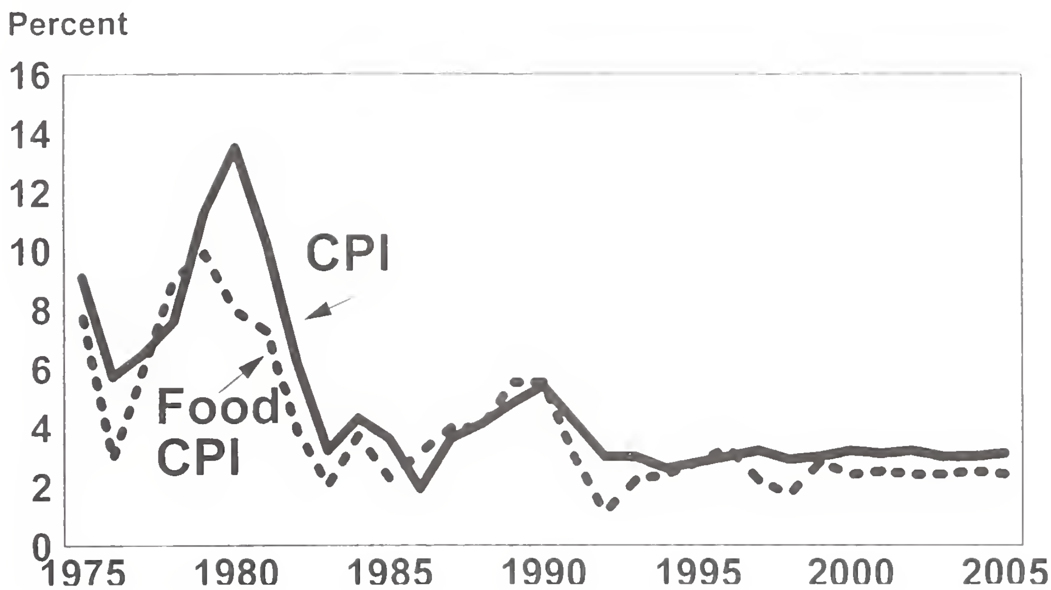
Net Farm Income



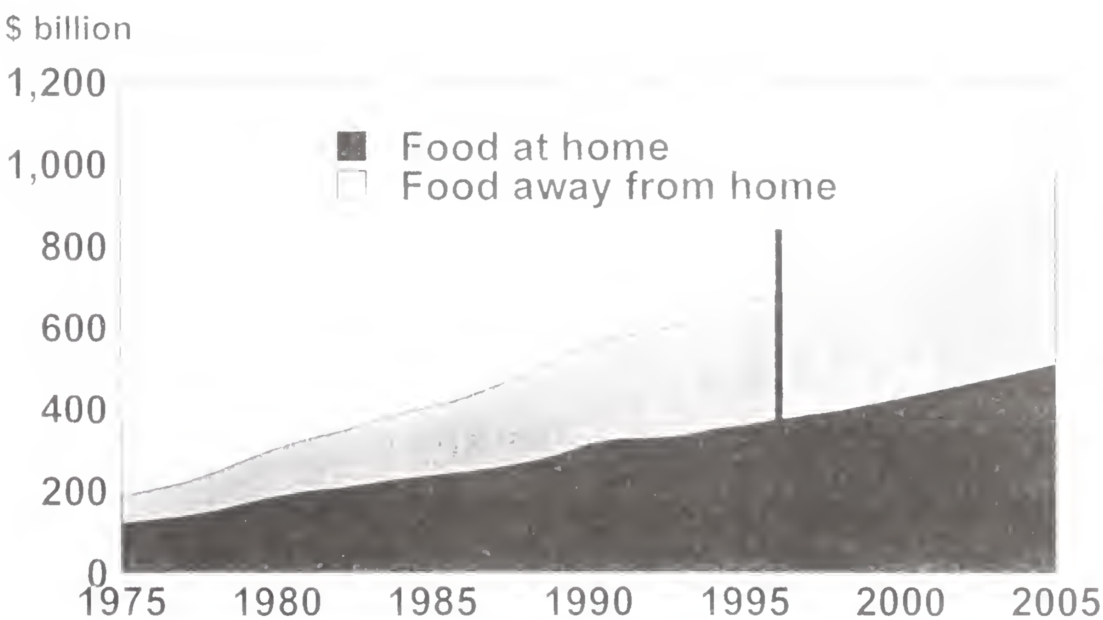
Debt to Asset Ratios



Food Inflation to Remain Under General Inflation



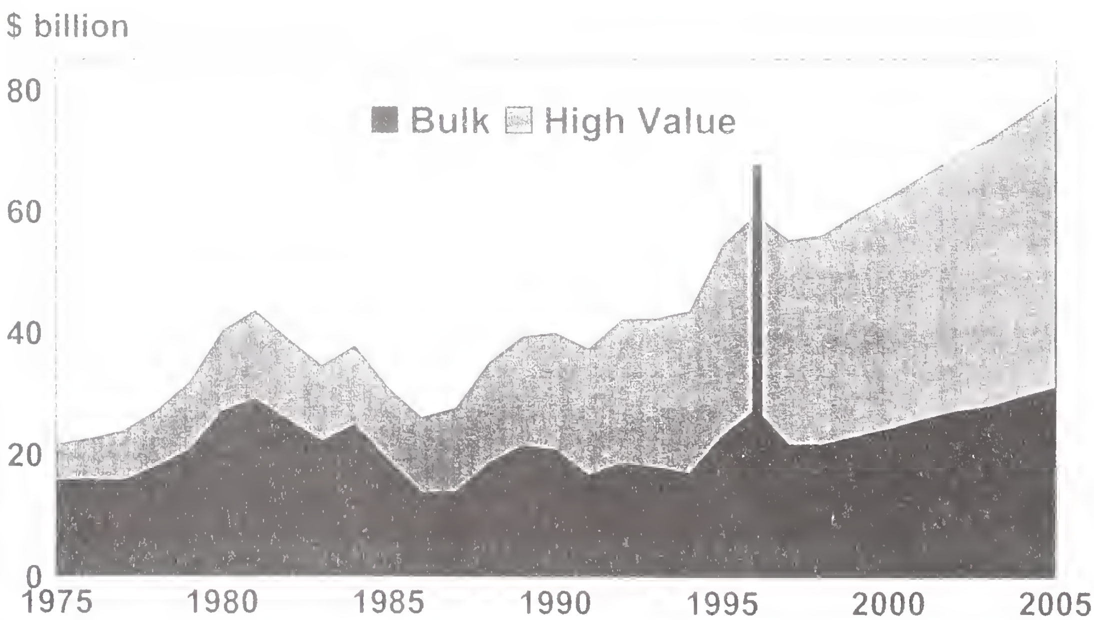
Food Eaten Away From Home Continues to Grow Faster



Major Factors Explaining USDA Baseline

- *Strong Growth in Export Demand*
- Domestic Policy (1996 Farm Act) and Policy Assumptions
- Trade Agreements and Unilateral Policy Reform in Other Countries
- Structural Change in U.S. Agriculture

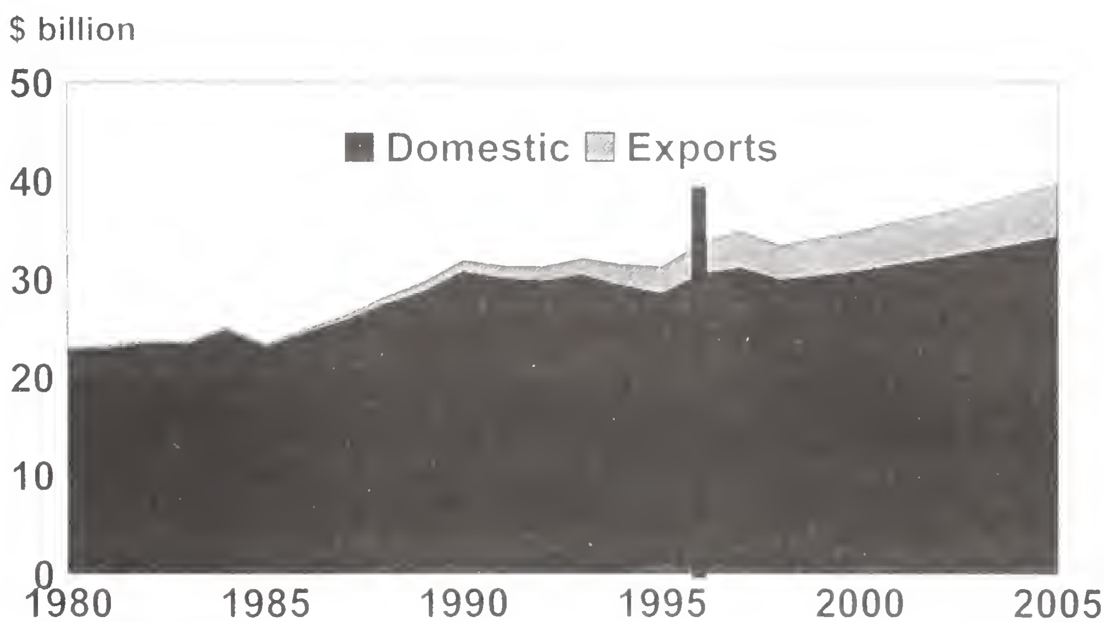
Growth of U.S. Agricultural Exports



U.S. Baseline Crop Demand Growth

	Annual Rate of Demand Growth 1991-95 to 2005		Export Share of U.S. Demand	
	Domestic	Exports	1991-95	2005
	Percent			
Wheat	0.9	1.5	52	53
Corn	1.5	4.1	21	27
Soybeans	1.3	2.0	34	36
Rice	2.2	-1.9	45	33
Cotton	2.0	0.3	40	35

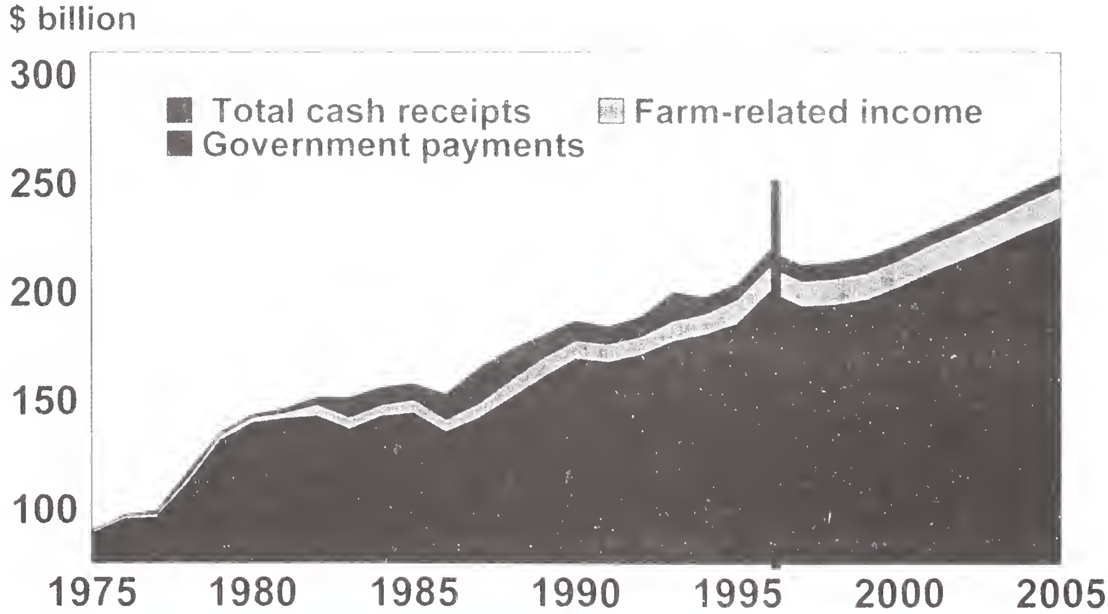
Farm Value of Domestically Produced Meat



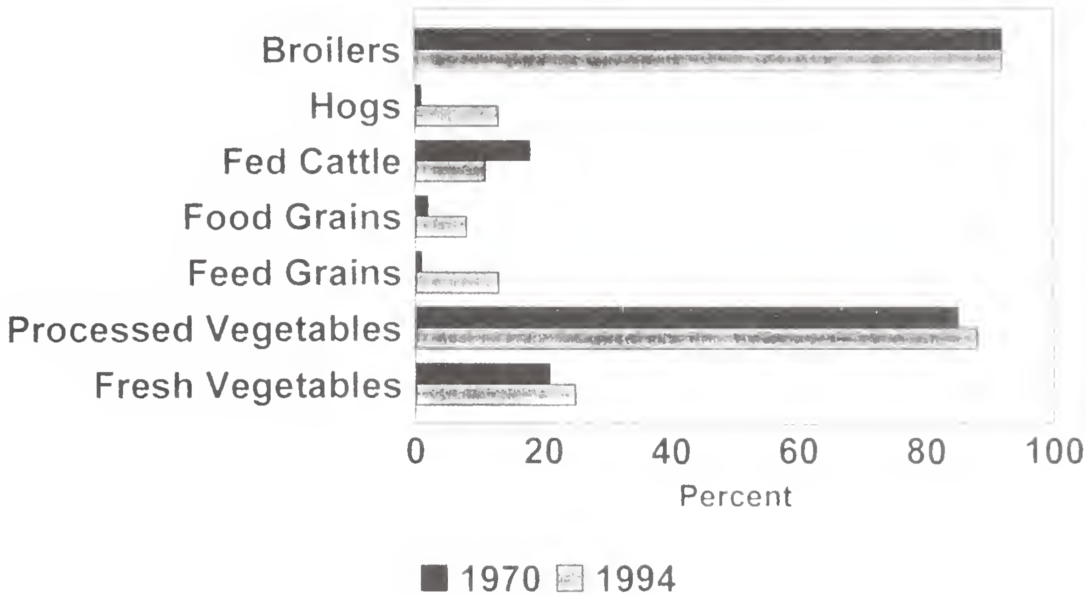
The Federal Agriculture Improvement and Reform Act of 1996 Increases Market Orientation

- Supply Management/Income Support Progams Modified
- Dairy, Sugar, and Peanut Programs Revised
- Trade Provisions Targeted
- Environmental Programs Consolidated and Extended

Government Payments Becoming Less Important as a Source of Gross Cash Income



Growth in Contracting,1970 to 1994



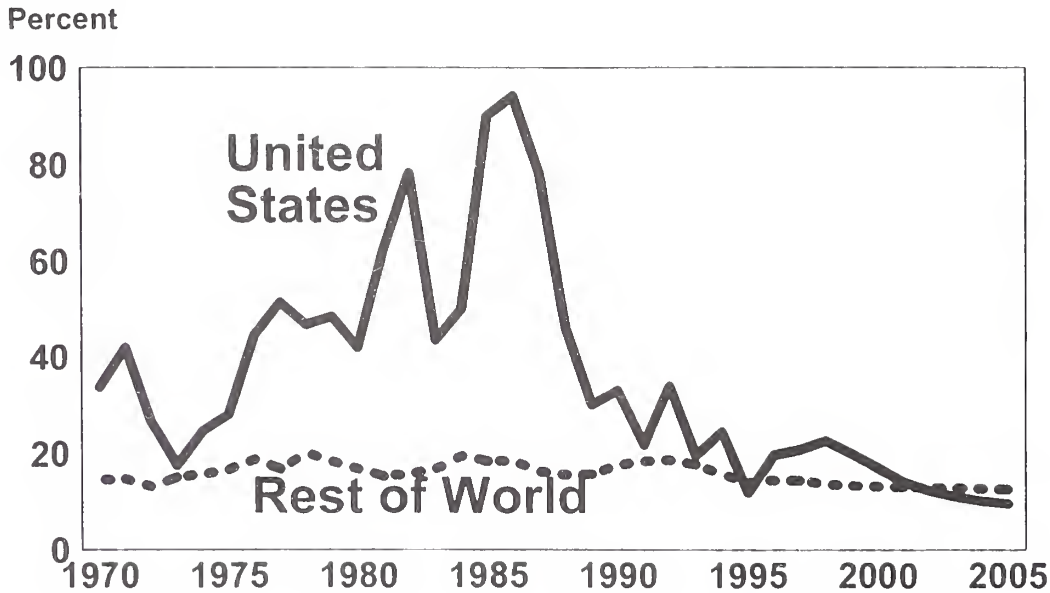
Important Sources of Uncertainty

- *Policy*
  - *Domestic Policy*
  - *Unilateral Policy Changes by Trade Partners or Competitors*
  - *Multilateral or Regional Trade Agreements*
- Income Growth--Particularly in Developing Economies
- Domestic and International Agricultural Supply Response
- Energy Prices
- Price Volatility, Grain Stocks, and Food Security

Farmers Will Look for Strategies to Manage Increased Income Risk

- Futures Markets
- Forward Contract
- Reduce Debt/Increase savings
- Diversification
- Crop and Revenue Insurance
- Use Market Information

U.S. Grain Stocks to Use Tightening Relative to the Rest of the World



INTERNATIONAL BASELINE PROJECTIONS TO 2005[1]

Rip Landes
International Baseline Coordinator
Economic Research Service

Introduction

As has been the case for the last several years, the USDA baseline calls for robust growth in global import demand. U.S. exports of high-value products (HVPs), including meats and horticultural products, will continue to show strong growth, generally outpacing bulk exports and accounting for a growing share of U.S. farm exports. Strong export growth is also projected for bulk commodities, particularly feed grains and wheat, driven largely by prospects for solid economic growth in developing countries. U.S. bulk commodity exports are projected to expand more rapidly than during the 1985-95 period and help propel total U.S. farm exports to average annual growth of about 4 percent. The baseline calls for tightening bulk commodity markets, with real prices that are declining, but at a slower rate than their long term trend (fig. 1). The extent to which global supplies will respond in an environment of firmer prices is a key uncertainty in the outlook.

USDA's annual baseline projections are the product of an interagency process chaired by the World Agricultural Outlook Board (WAOB). In addition to the WAOB, major contributions are made by commodity and regional analysts from the Economic Research Service, the Farm Service Agency, and the Foreign Agricultural Service. The published projections are based on a combination of model output and analyst judgement. A set of multi-commodity and multi-regional trade models helps to impose economic consistency on the USDA projections. Analyst judgement is used to address issues not handled adequately by the models, and generally is has a more significant impact on the early years of the projections. While we welcome questions about our methodology, the remainder of our presentation will focus on key baseline results and issues.

It is important to understand and interpret the USDA baseline projections as a conditional long run scenario, rather than a forecast. USDA baseline assumptions are intended to generate a scenario that provides a neutral backdrop for analysis of the impacts of alternative policies, weather shocks, or other factors. These projections incorporate the provisions of the 1996 U.S.

[1] These projections are published in *Agricultural Baseline Projections to 2005, Reflecting the 1996 Farm Act* (WAOB-97-1), February 1997. *International Agricultural Baseline Projections to 2005*, a companion report providing foreign country details of the USDA baseline published by ERS, is forthcoming.

Farm Act, and assume that it is extended through 2005. They do not attempt to account for any shocks due to such factors as weather or business cycles. It is assumed that all countries comply with existing bilateral and multilateral agreements, including the Uruguay Round Agreement, but that no new bilateral or multilateral agreements occur during the 1997-2005 period. This is particularly important to keep in mind, given the upcoming World Trade Organization (WTO) mini-round, and potential agreements on WTO accession, European Union-15 (EU) enlargement, and bilateral trade that could emerge. Past agreements have had significant impacts on U.S. agricultural trade in recent years, particularly in HVPs, and so could future agreements. Most remaining assumptions, however, are consistent with expected future events. These include assumptions on income growth, parameters affecting agricultural supply and demand and, importantly, the evolution of agricultural policies in foreign countries. Thus, the process of unilateral policy reform in developing countries is not ignored in the projections, and assumed to continue to evolve based on analyst judgement.

Macroeconomic Outlook

Prospects for stronger economic growth in developing and transition economies, a common view among vendors of global macroeconomic forecasts, are a key driver of the USDA projections (fig. 2). Economic growth rates in Asia, the largest global and U.S. market for agricultural commodities, are expected to continue to lead the world through 2005. China and Southeast Asia are likely to remain the fastest growing areas of the world, fueling sustained rapid expansion of per capita incomes, food demand, and diet diversification. Although growth is likely to slow somewhat in East Asia (Hong Kong, Japan, S. Korea, and Taiwan), it will remain sufficient to yield steady gains in demand for an increasingly diverse diet.

While strong Asian growth is not new to the outlook, the significantly improved economic prospects in other developing areas differentiates the 1997-2005 outlook from the past 10-15 years. Significantly faster income growth is anticipated in Latin America (including Mexico), North Africa, and the Middle East during 1997-2005. This favorable outlook is encouraged by the progress made in implementing and sustaining economic and institutional reforms in many countries across these regions, but is heavily dependent on the continuation of reforms. For the Middle East and parts of North Africa, improved prospects are also linked to the forecast of strengthening real petroleum prices that is part of the USDA outlook.

Another important factor that should distinguish the next 10 years from last, is the restoration of positive rates of economic growth in the transition economies of the Former Soviet Union (FSU) and, particularly, Central and Eastern Europe (CEE). The variability and eventual collapse of effective demand in these countries was a key influence on global markets during the last 10 years. Restoration of positive, if slow, rates of income growth should halt the declines in food demand and stabilize trade. And, particularly in the FSU, increased market orientation and constrained budgets should reduce volatility in both economic growth and food trade.

Developing Countries Key to Demand Prospects

The most critical demand relationship at work in this long term food outlook is the one between per capita income growth and the pattern of consumer demand in developing countries. Particularly important is the relatively strong growth in meat and feed demand that typically occurs in developing countries with per capita incomes of $500-$5,000 (fig. 3). In the USDA projections, sustained rapid growth in Asia, combined with improved growth in Latin America, North Africa, the Middle East, and CEE, leads to robust expansion of per capita meat consumption and demand for feeds. Since most countries, and particularly developing countries, tend to produce meat domestically rather than import it, we expect most of the trade impact of this feed-livestock expansion to be in energy and protein feeds (fig. 4). Also important to the demand outlook is that many of these countries are at the stage of growth where food demand for wheat and vegetable oils tends to increase most rapidly.

The key role of developing countries in longer term agricultural commodity demand prospects is summarized in figure 5. Developing country demand growth will exceed world demand for all major commodities except rice. Aggregate developing country demand growth is highest in feeds, meats, and vegetable oils. Demand growth in developing countries is sharply higher than developed countries for feed grains and meals.

Future demand trends in China's large and dynamic economy are particularly important to the long term outlook. With its world-leading economic growth rate, it provides a dramatic example of the pattern of food demand growth that is typical in developing countries (fig 6). Food grain demand has shown little growth in per capita terms since the mid-1970s, while per capita demand for meats, feeds, and vegetable oils has soared. This pattern continues in the USDA projections, with slower, but still rapid growth in per capita meat and feed demand, and little or no growth in per capita food use of wheat or rice.

It is important to note that future demand (and supply) prospects in China are one of the key uncertainties in the global food outlook. With its large population, dynamic growth, uncertain future policies, weak data, and diverse food sector, China's long term outlook is likely to remain uncertain. The USDA projections strive to employ the best available information, and to find the central tendency in the estimates of the many uncertain parameters used in the China projections.

Expected Supply Developments

Firmer prices and supportive policies are expected to lead to a recovery in global grain area during 1996-2005 (fig. 7). In developed countries, the decline in grain area during 1980-95, was associated with global sluggish demand and supply management policies, primarily in the United States and the EU. During 1997-2005, we expect grain area in developed countries to rise with market incentives, increased planting in the United States, and reduced land set-asides averaging 12 percent in the EU.

In the transition economies, which saw the largest declines in grain area during 1980-95, we expect grain area to stabilize and grow moderately, predicated primarily on the recovery of domestic, rather than foreign, demand. In general, we expect the recovery in crop area to be consistent with the pace of institutional and policy reform and occur fastest in the Visegrad countries (Poland, Hungary, Czech Republic, Slovakia) and, to a lesser extent, Russia. The expansion of grain area in developing countries slowed during 1980-95, but did not show the decline evident in other regions. Cropped area in developing countries is likely to continue to expand in areas where climate and water availability will support more intensive cultivation. Grain area in both importing and exporting developing countries is also expected rise in response to firmer prices.

By commodity, the global crop area projections reflect the pattern of demand, with the strongest increases in coarse grain and wheat area. Rice area continues to reflect the slow upward trend in rice demand. Oilseed area growth is projected to slow as strengthening grain prices increase competition for land, slowing growth in soybean area, and pulling some area out of rapeseed and other oilseeds.

Future Crop Yield Trends Uncertain

Future trends in crop yields are probably the major uncertainty in the long term outlook. Global yield growth appears to have slowed, although performance has varied by region, commodity, and time period (fig. 8). But, how will investment in both variable and fixed inputs respond and raise yields in the longer term as prices strengthen according to our scenario? The impact of increasingly market-oriented farm policies in the United States and some other developed and developing countries on supply response is unclear. In Latin America and other developing regions, it is unclear how the improving macroeconomic climate will affect agricultural investment and productivity. Further, it is increasingly difficult to predict the pace of development and adoption of biotechnology-related advances that will be coming on stream in the future.

The USDA projections attempt to capture the effects of these dynamic factors. In the current baseline, we project a significant recovery in yields for major crops in the FSU and CEE, but somewhat slower aggregate yield growth in both the developed and developing regions (fig. 9). Globally, wheat yield growth is projected to match performance during 1985-95, and corn yield growth is projected faster, but these results are predicated largely on the anticipated, but highly uncertain, rebound in the transition economies. However, our analysts remain cautious about the pace of reforms and prospects for productivity gains and the projections reflect this, as projected yields in both the FSU and CEE remain below historical highs. While we attempt to account for dynamic factors that may tend to strengthen yield growth in our scenario, it is possible their impact has not been completely accounted for.

China is also an important country to examine on the supply side of the equation. The official Chinese data indicate that yields for many crops, including wheat and corn, are high by world standards and suggest limited potential for future growth (fig. 10). However, evidence suggests

that yields calculated from official data are biased upward because area harvested is significantly underestimated. The bias is judged to be particularly large for corn. As a result, the USDA projections allow for substantial future yield growth from a lower level than indicated by official data. We look forward to the results of China's current agricultural census to help clarify this issue.

Major Commodity Trade Prospects

A summary of historical and projected growth rates in global imports shows that, although growth is projected slower for several commodities, particularly meats, projected demand remains strong for meats, feeds, and wheat (fig. 11). Particularly important to the U.S. trade outlook is the stronger expected growth in import demand for coarse grain, wheat and, to a lesser extent, cotton. The slowdown in meat trade, as will be discussed later, is largely associated with expected developments in East Asia, the FSU, and China, as well as with our assumption of no new market-opening agreements.

Coarse Grains

The USDA projections show broad-based growth in coarse grain import demand to support expanding feed-livestock sectors across developing regions, including China, South and Southeast Asia, Latin America, North Africa, and the Middle East (fig. 12). China's coarse grain imports are projected to rise more than 10 percent annually, and South and Southeast Asian imports about 9 percent annually. Annual growth in other developing regions is expected to be more modest, in the 3-4 percent range. East Asia, now by far the largest regional feed grain market, is expected to show very little growth, as trade reforms make local meat production uncompetitive and a rising share of meat consumption is imported. EU imports are also likely to remain relatively flat, due to sluggish growth in domestic meat demand, and export constraints imposed by UR export subsidy limits.

The FSU, a key source of instability in global coarse grain trade during the 1980s and early 1990s, is expected to be a small player in the market during 1997-2005. We expect only a slow recovery in meat demand and production, with domestically produced meat remaining uncompetitive with imported meats in key markets. With a smaller market presence and severe financial constraints, the FSU is unlikely to be as large a source of instability in global markets during the projection period.

The United States is expected to maintain its dominant two-thirds share of the global coarse grain market (fig. 13). EU competition, primarily barley, is likely to be constrained by the UR export subsidy limits throughout the projection period. While Argentina is expected to boost its corn exports, other traditional competitors are expected to be restrained by competition for crop land. The transition economies, primarily in CEE, are expected to be emerging competitors after 2000 when gains in U.S. corn area slow and prices strengthen.

Soybeans and Meal

The expansion of feed-livestock sectors in developing Asia, Latin America, North Africa, and the Middle East, is also expected to drive steady, robust growth in demand for soybeans and meal (fig. 14). Developing Asia, particularly China and Southeast Asia, is expected to be the fastest growing market, with imports expanding about 8 percent annually. Gains in these developing regions are projected to more than offset sluggish growth in feed demand in East Asia and the EU-15.

As was the case during the early 1990s, U.S. soybeans and meal are expected to maintain market share against South American competitors, with the U.S. share averaging 43-44 percent (fig. 15). Relatively large gains in U.S. soybean yields relative to Argentina and Brazil are expected to continue to underpin U.S. supplies and competitiveness, particularly during the next 5 years.

Wheat

As with feeds, income gains in developing countries are expected to drive stronger growth in wheat trade during 1997-2005 (fig. 16). In many developing countries, per capita wheat consumption remains responsive to rising incomes and urbanization, and capacity to produce wheat efficiently is limited. In China, although per capita wheat consumption is not expected to grow, imports are expected to expand about 4 percent annually as water shortages continue to inhibit yield gains. The North Africa and Middle East market, where we also project 4 percent annual import growth, is another key to wheat trade prospects. We expect wheat demand to respond to faster income growth in most of North Africa and the Middle East. We also expect limited production gains in some countries because of market-oriented reforms are reducing government support, as well as limited potential for area or yield gains. As with coarse grains, we expect the FSU to be a relatively small player in the global wheat market, with much less scope to be a source of instability, during 1997-2005.

Prospects for U.S. wheat market share are closely linked to policy developments in the EU (fig. 17). We expect U.S. share to recover from its 1996 decline and remain near its recent average of 34 percent through 2005. EU market share is expected drop until about 2001 as its exports are constrained by UR export subsidy limits, but then rise when world prices are high enough to permit unsubsidized exports. Gains in EU market share after 2000 are expected to come at the expense of less competitive emerging exporters, rather than U.S. sales. This scenario assumes a 12 percent EU land set-aside for 1998-2005, limited changes only to the administration of existing EU wheat intervention policies to permit internal market prices to drift below intervention, and moderate appreciation of the European Currency Unit against the dollar. A smaller EU set aside could increase its competitiveness after 2001, but would likely lead to rising supplies of barley that would be uncompetitive with wheat for domestic feed use, and not exportable under UR export subsidy limits. Assuming a change in the Common Agricultural Policy to reduce the wheat intervention price would also increase EU competitiveness, but is considered unlikely outside of a formal enlargement agreement with CEE countries.

Rice

World rice trade expanded sharply during the early 1990s, largely because Japan and South Korea began importing rice under the terms of the UR agreement, and two large markets, China and Indonesia, increased their purchases (fig. 18). The USDA projections call for these markets to grow slowly from their new levels. The projections also call for import demand in Latin America and, particularly North Africa and the Middle East, to respond to stronger income growth. The higher level of rice trade during early 1990s was supplied, to a large extent, by uncharacteristically large exports from Vietnam and India. We expect these countries, as well as Burma, to largely sustain their higher market shares through 2005. U.S. market share is expected to decline because of rising domestic consumption and lower planted area expected under the 1996 Farm Act.

Meats

The long term outlook for global beef, pork, and poultry trade is largely dependent on developments in three large markets: East Asia, the FSU and, for poultry, China (figs. 19, 20 and 21). East Asian meat imports, dominated by Japan (beef, pork, and poultry) and South Korea (beef), expanded rapidly during the 1980s in response to strong consumer demand and negotiated increases in market access. Based on already ratified multilateral and agreements, we expect steady growth in East Asian meat import demand as imports continue to substitute for relatively high cost local production. However, import growth will remain slower than during the 1980s and early 1990s unless additional market access is negotiated.

Large imports by the FSU, principally Russia, were also a significant feature of world meat markets during the 1980s. The collapse of inefficient domestic production, combined with the availability of credits and subsidies for imports from the EU and the United States, were key factors behind this trade. For 1997-2005, we see roughly steady import demand, based on very modest growth in consumer demand in the FSU, combined with very slow progress in the development of beef, pork, or poultry sectors that can compete effectively with imports. A decline in the availability of subsidized meat exports for the EU will be a significant constraint on growth in FSU pork and beef imports.

Imports by China, both direct and via Hong Kong, have been a source of rapid poultry trade expansion during the early 1990s. The rate of future growth in this trade is very unclear, in part because of the uncertain impacts of Hong Kong's accession to China on administration of trade via Hong Kong. It is also possible that limitations imposed by inadequate refrigerated transport and storage may eventually slow trade growth. Our projections assume that China's poultry imports slow from recent rates, but continue to show strong 10 percent annual growth.

U.S. beef, pork and, especially, poultry have been very competitive in world markets, capitalizing on new market opportunities to grow more than 20 percent annually in volume terms during 1985-95 (fig. 22). U.S. meat products are expected to remain highly competitive during

1997-2005 but, given the outlook for slower growth in imports by East Asia, the FSU, and China, and the baseline assumption of no new market access agreements, U.S. meat export growth is projected to slow significantly. Baseline growth in U.S. meat export volume is about 6 percent annually, with value growing somewhat slower as lower quality products continue to account for a growing share of U.S. exports.

Cotton

After showing little growth during 1985-95, world cotton trade is projected to expand about 1.2 percent annually during 1997-2005, the result of strengthening developing country demand and prospects for slow production growth in the FSU and China (fig. 23). Import demand in more developed regions, including East Asia will continue to slide as spinning moves to lower-cost regions. These declines are expected to be more than offset by rising imports in Southeast Asia, Latin America, and China. Slow growth in both imports and exports is expected by the FSU, as demand gradually strengthens and only limited production gains are achieved. The United States is projected to remain the largest exporter of raw cotton, maintaining roughly a 25 percent market share, while many competitors reduce raw cotton exports and channel supplies into consumption or exports of textiles and value-added products.

U.S. Export Outlook Remains Robust

In the current USDA baseline, the nominal value of U.S. farm exports shows robust annual growth of about 4 percent during 1995-2005, reaching nearly $80 billion by 2005 (fig. 24). HVPs continue to lead the growth in U.S. agricultural exports, expanding about 5 percent annually. U.S. bulk commodity exports are also projected to show strong gains of more than 3 percent per year.

Each of the major categories of U.S. HVP exports--meats, fruits, and vegetables--is expected to show strong, steady annual growth of 5-7 percent in value terms (fig 25). These U.S. products are expected to remain highly competitive in their major markets, primarily East Asia, Canada, and Mexico. However, U.S. exports of these products are unlikely to sustain the rapid pace of the past 10 years. This is particularly true under baseline trade policy assumptions that include no new market access agreements. During 1985-95, market opening agreements with East Asian countries and NAFTA partners made these markets the key sources of U.S. HVP export growth (fig. 26).

Significantly stronger annual growth in the value of bulk commodity exports is expected to be a key source of strength in the U.S. trade outlook, and in the rural economy. Faster growth and firmer prices are projected for U.S. exports of most bulk commodities than occurred during the last 10 years, and particularly for coarse grains, wheat, and cotton (fig. 27). However, unlike HVP exports which generally depend on the more stable income and food demand growth of higher-income markets, bulk commodity demand and prices will be closely linked to the more fragile prospects for economic growth in developing and transition economies.

Figure 1. Real Prices Decline at Slower Pace as Markets Tighten

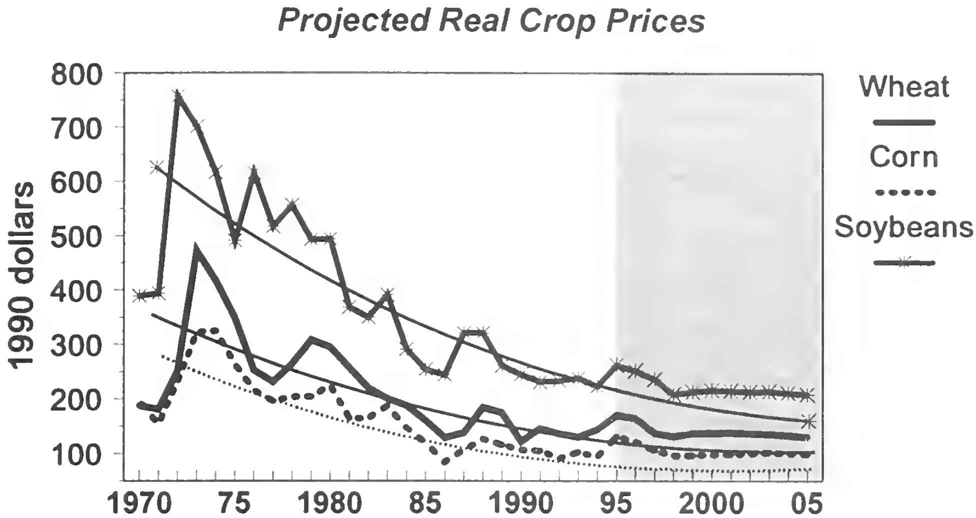


Figure 2. Global Economic Growth Key to Trade Outlook

- Strong developing country growth
  - Asia leads
  - Improved growth in:
    - Latin America
    - Middle East
    - CEE & FSU?
- Steady, relatively slow growth in developed countries

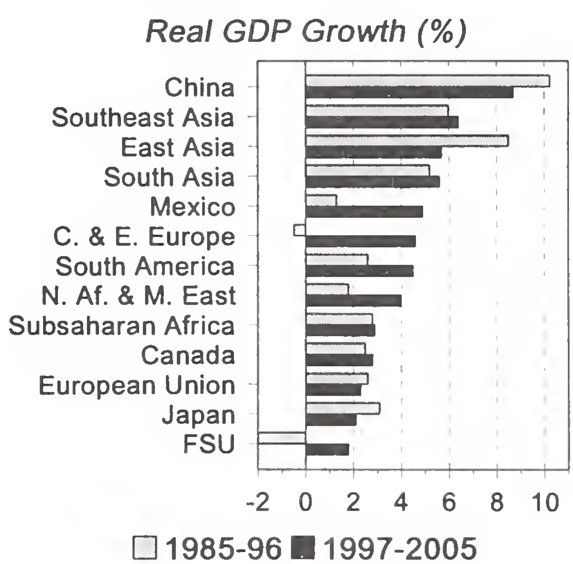


Figure 3. Strong Projected Growth in Meat Demand in Developing Countries

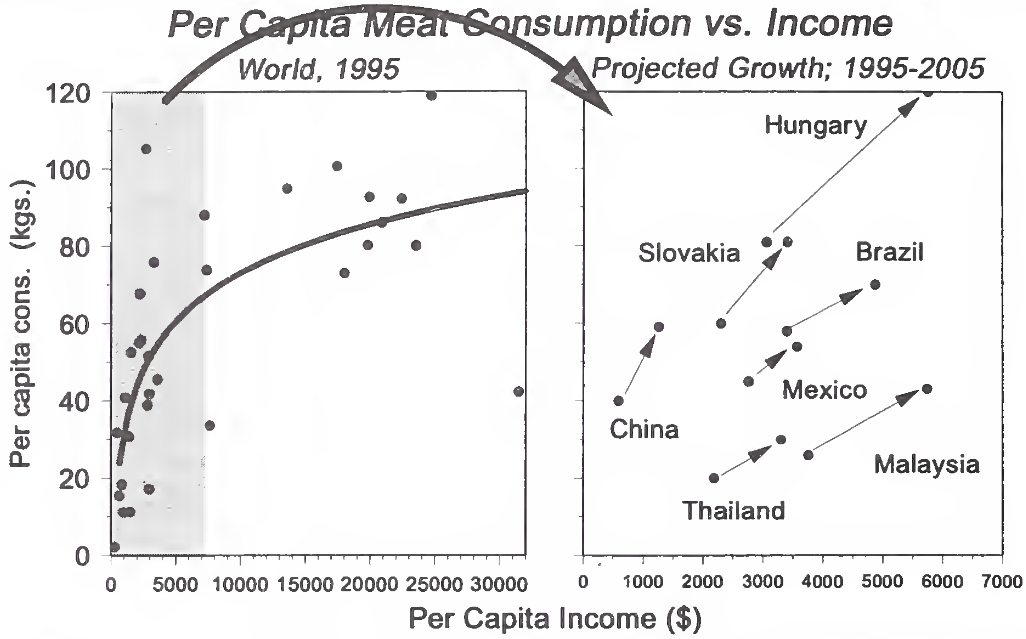


Figure 4. Most Countries Produce Their Meat Domestically

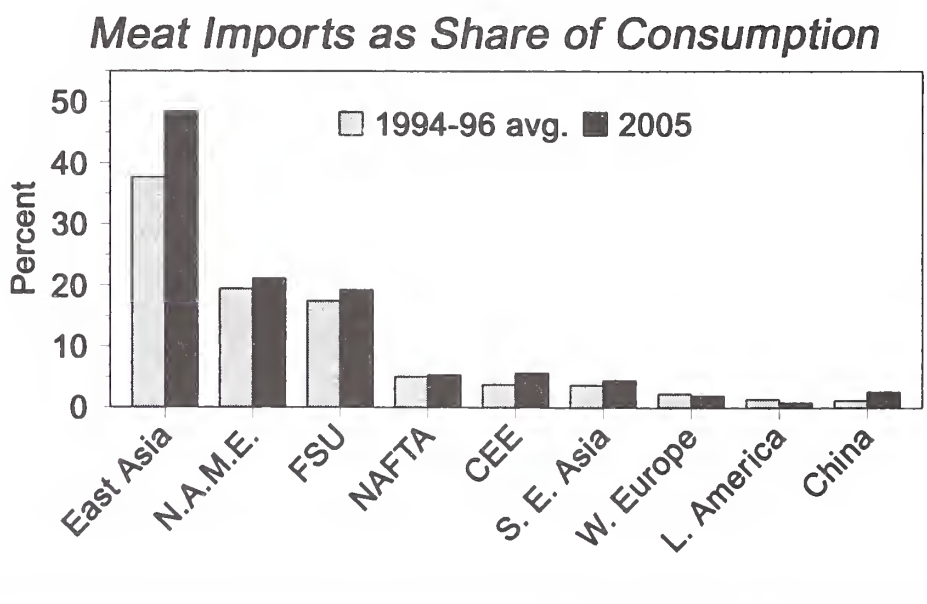


Figure 5. Developing Countries Lead Global Commodity Demand Growth

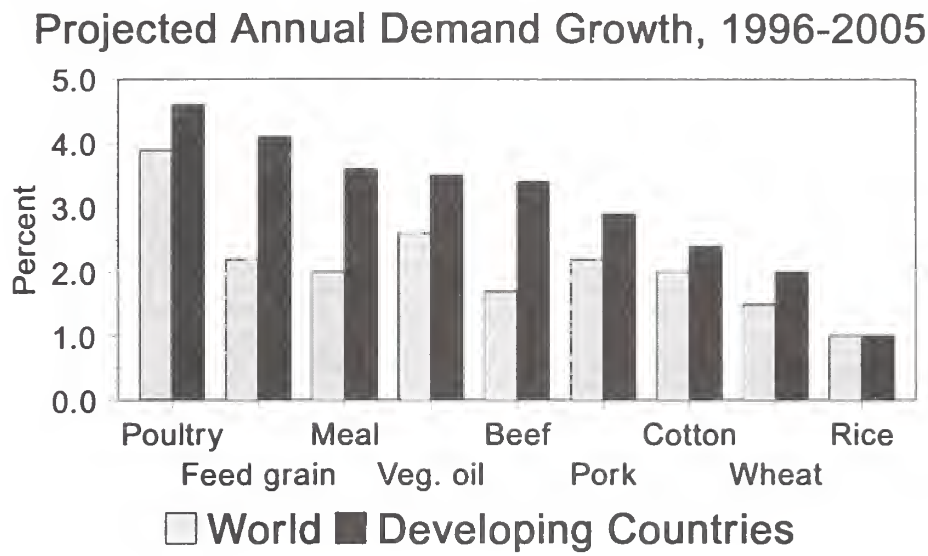


Figure 6. China: Most Growth Expected in Meat, Feed & Oils Demand

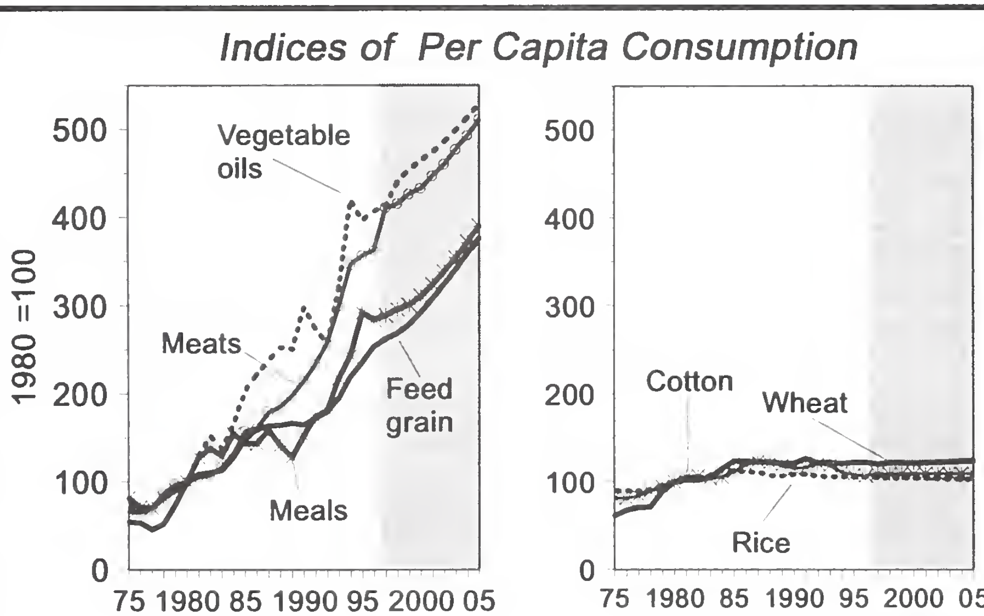


Figure 7. Global Crop Area is Projected to Rise

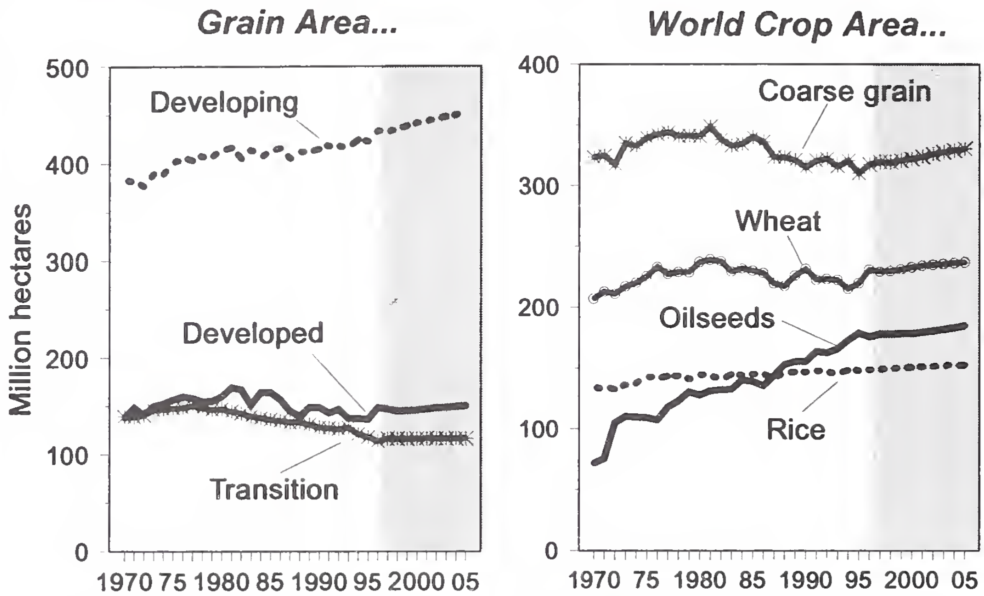


Figure 8. Global Yield Growth is Slowing

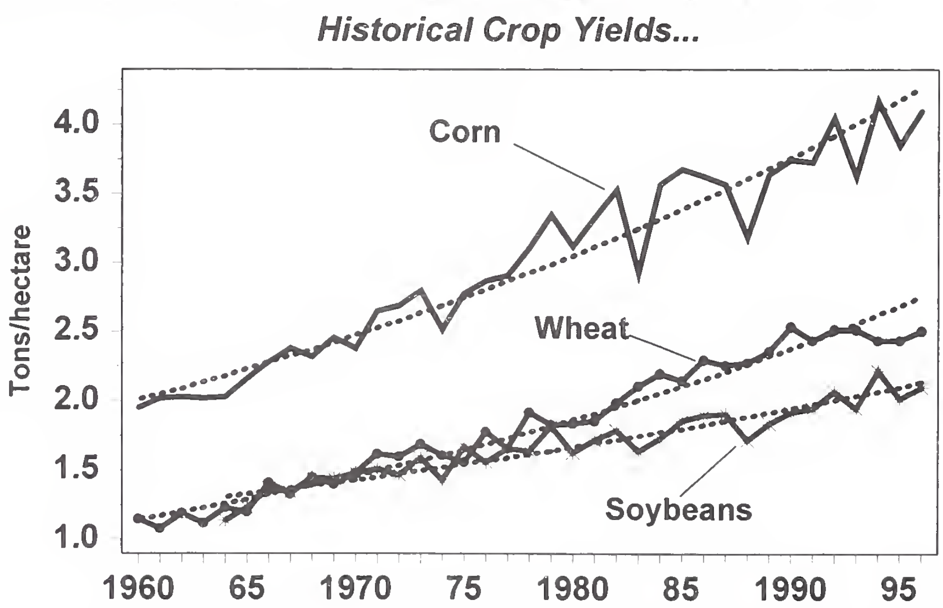


Figure 9. Yield Growth is Projected Slower in Most Regions

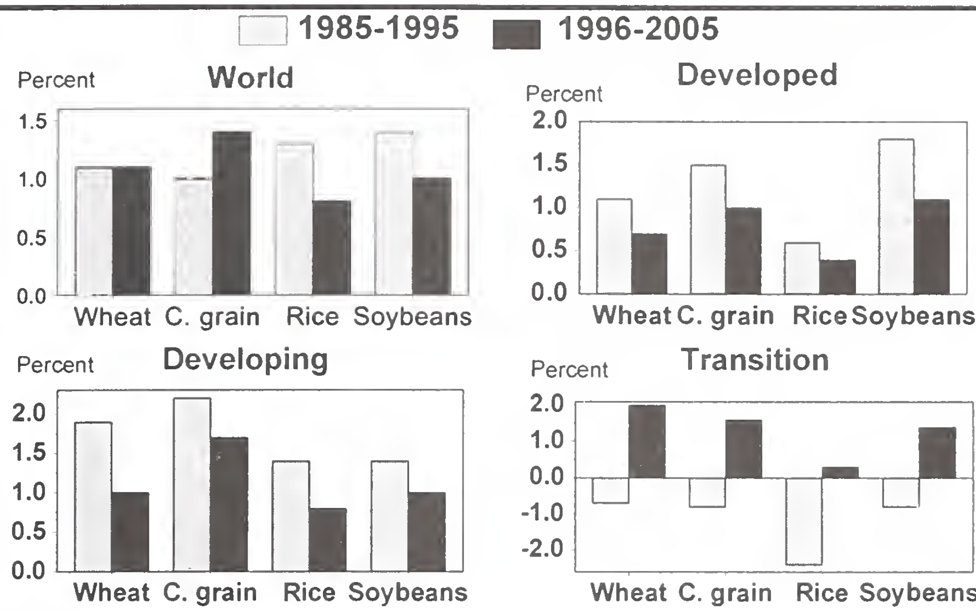


Figure 10. China: Estimated Yields Leave More Room for Gains

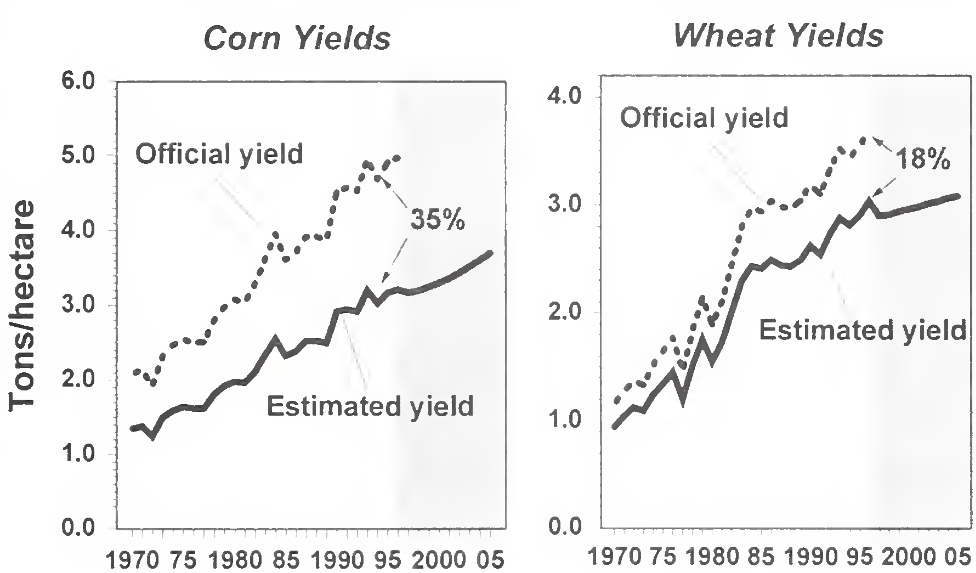


Figure 11. Global Import Demand Summary: Strong Growth Projected...

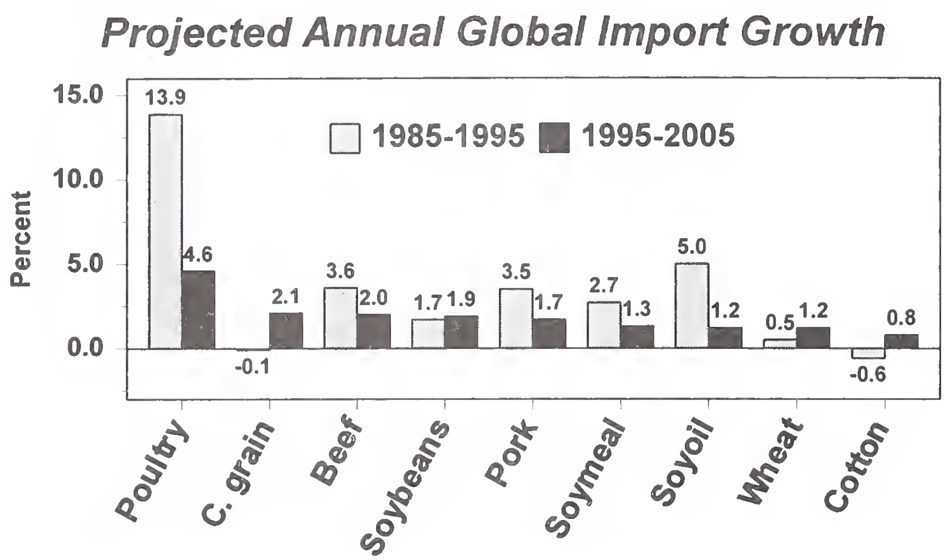


Figure 12. World Coarse Grain Imports

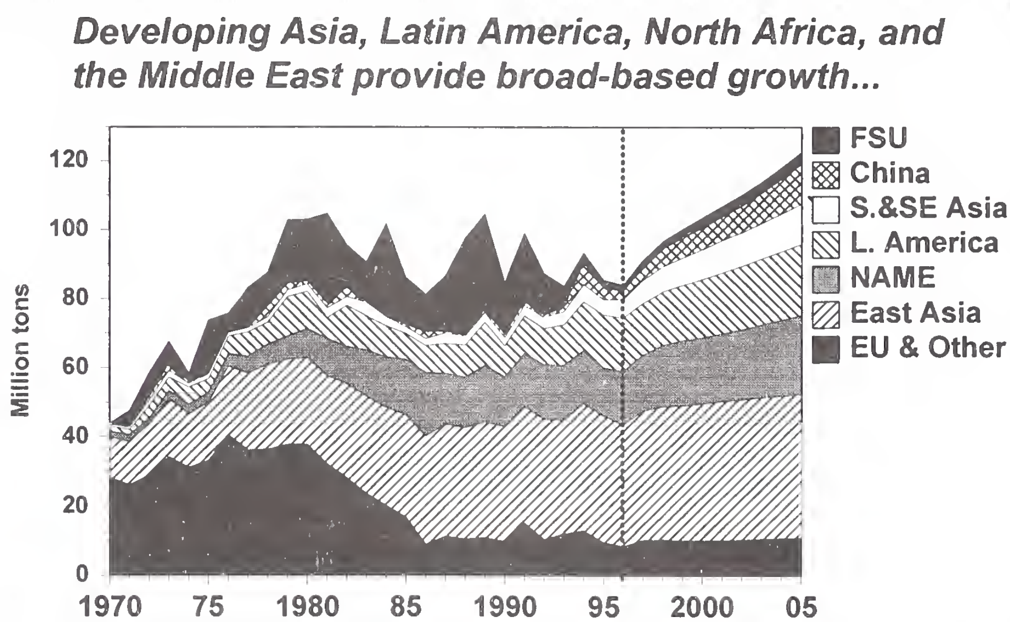


Figure 13. U.S. Projected to Remain Dominant Coarse Grain Exporter

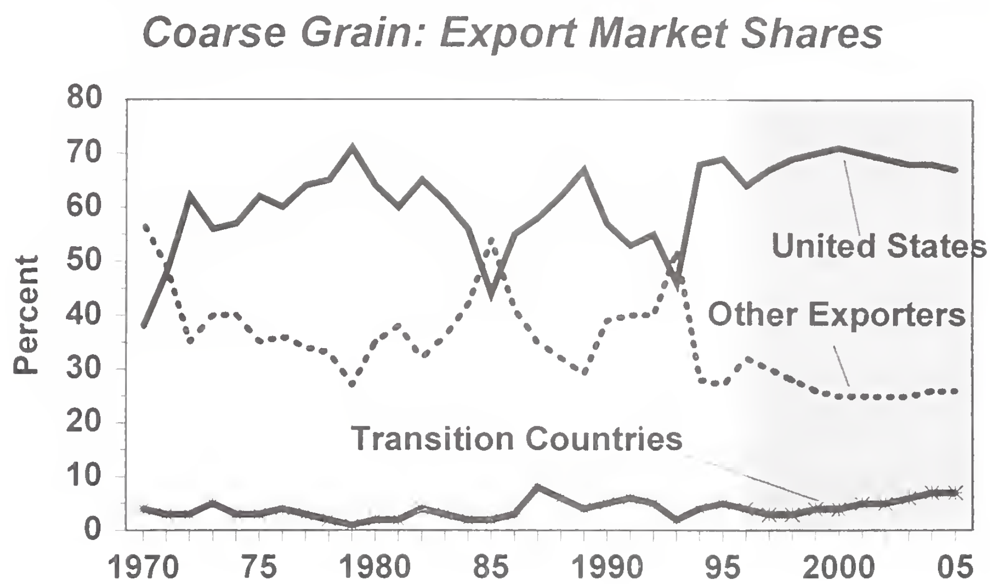


Figure 14. World Soybean & Meal Imports

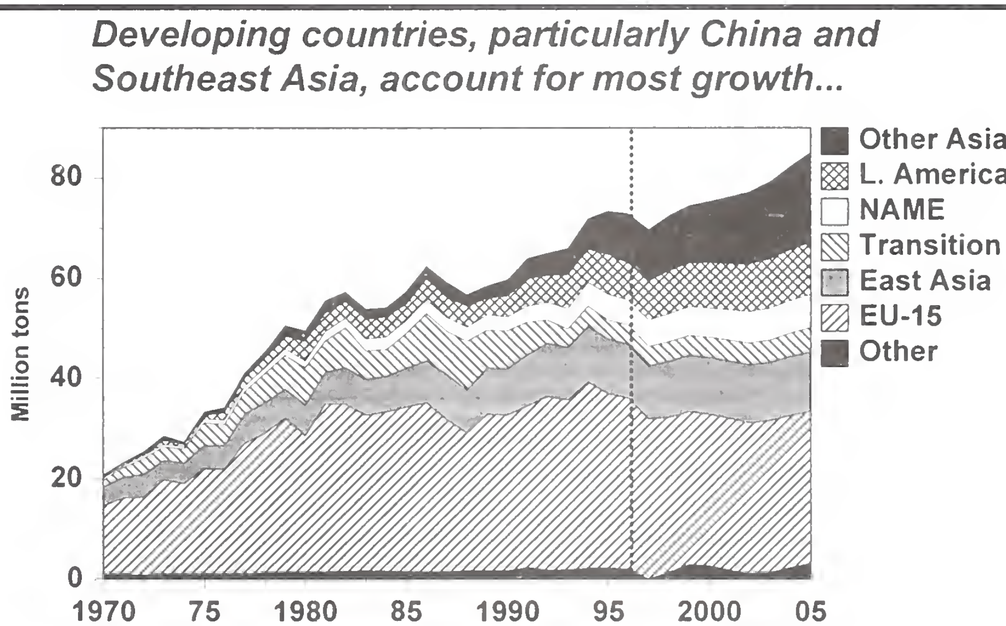


Figure 15. U.S. Projected to Maintain Market Share in Soybeans & Meal

Soybeans & Meal: Export Market Shares

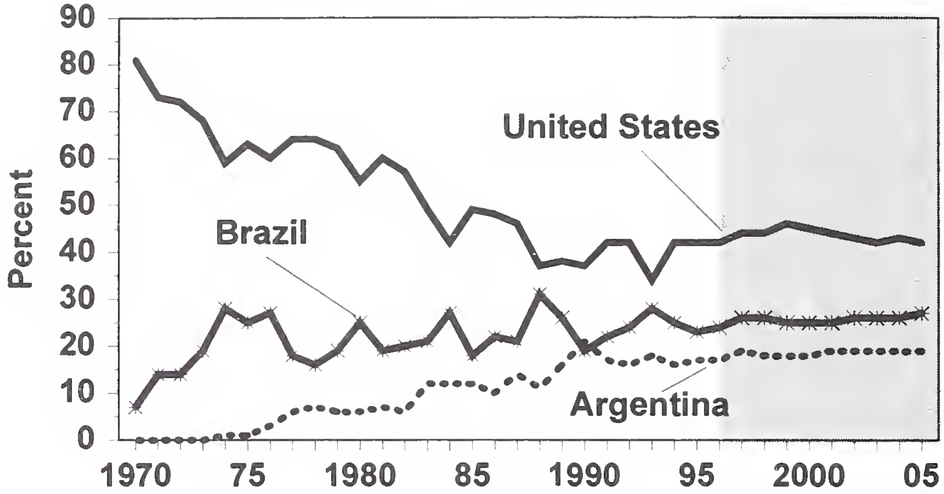


Figure 16. World Wheat Imports

Asia, China, North Africa & Middle East account for most of stronger projected growth in wheat imports...

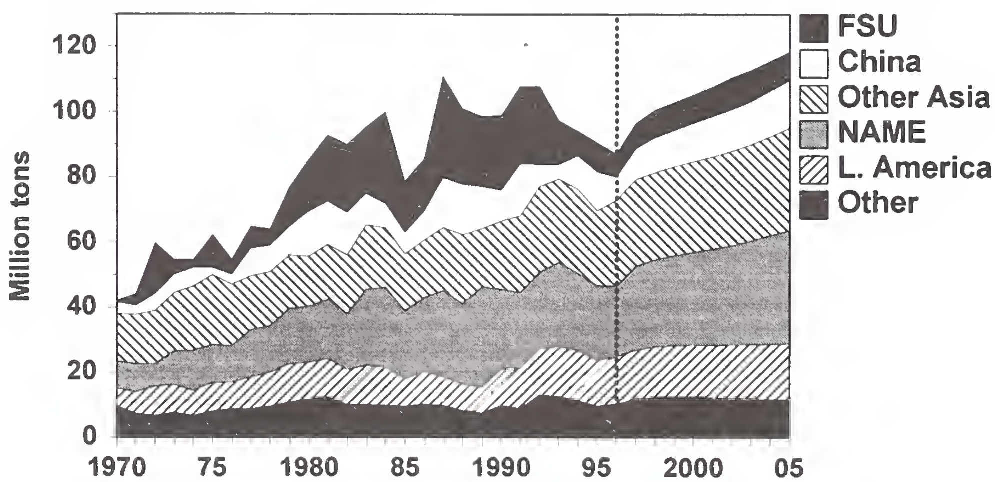


Figure 17. U.S. Wheat is Projected to Maintain Market Share

Wheat: World Export Market Shares

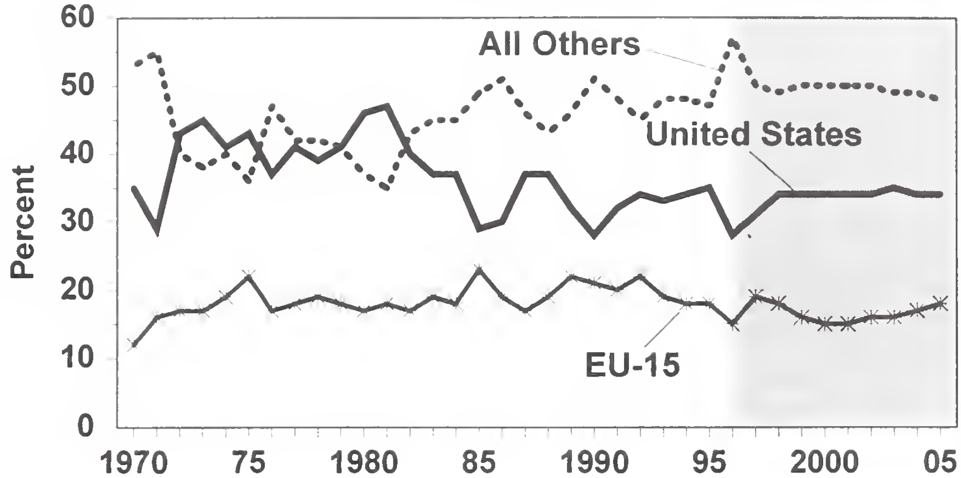


Figure 18. World Rice Imports

Asia, Latin America, North Africa & Middle East drive growth in rice trade...

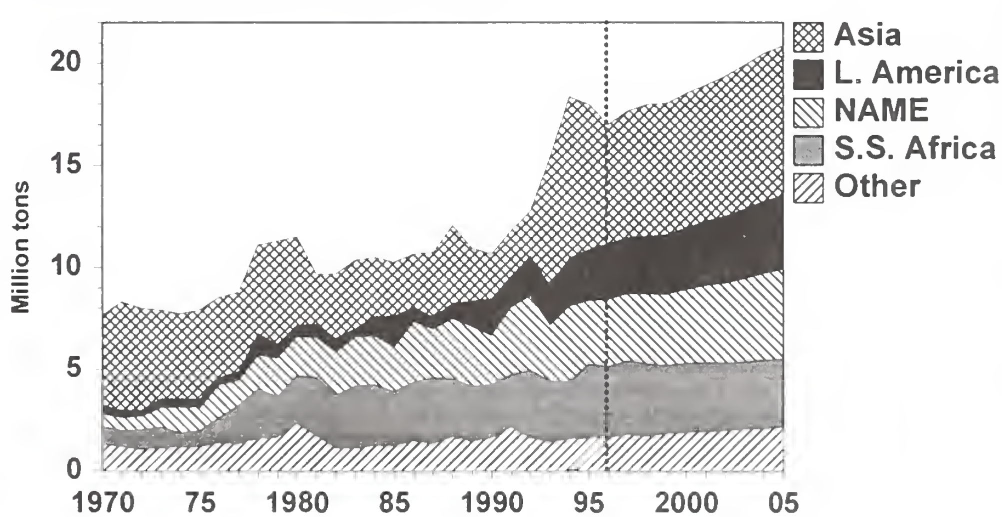


Figure 19. Major Beef Importers

East Asia, primarily Japan, accounts for most projected growth...

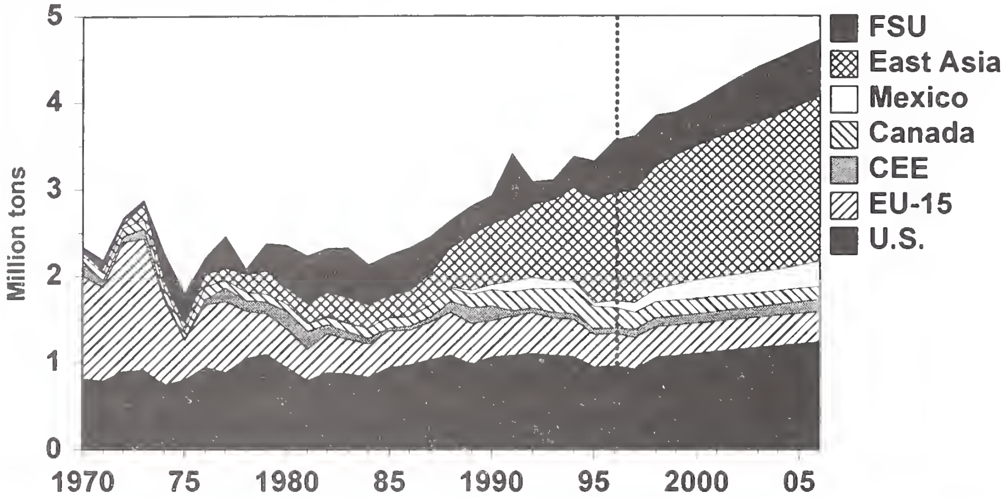


Figure 20. Major Pork Importers

Japan also accounts for most projected growth in pork imports...

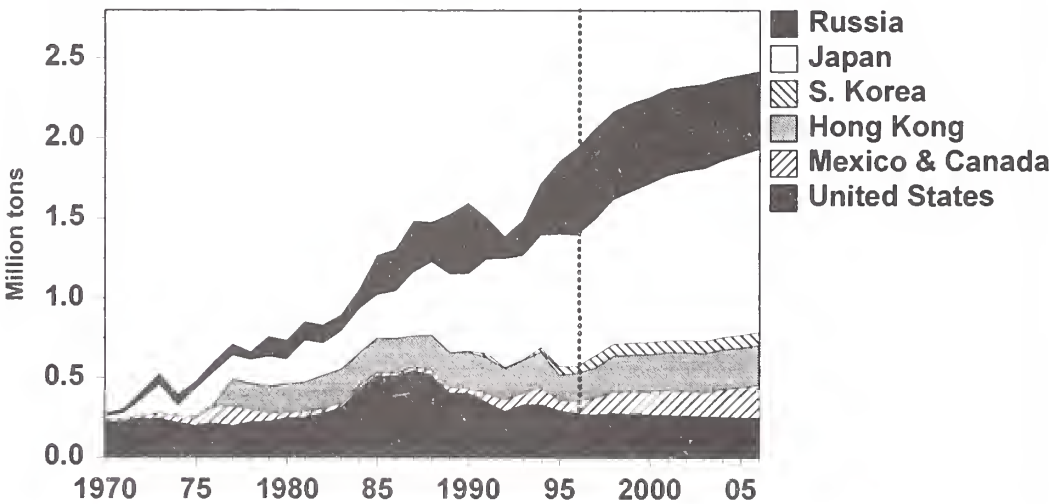


Figure 21. Major Poultry Meat Importers

East Asia, primarily Japan & China, accounts for most projected growth...

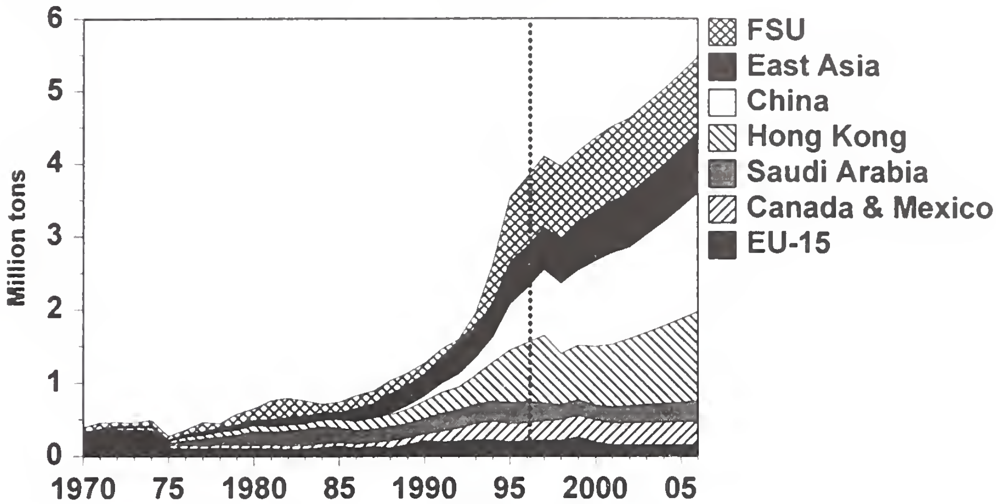


Figure 22. U.S. Meat Exports Projected to Grow, But at Slower Pace

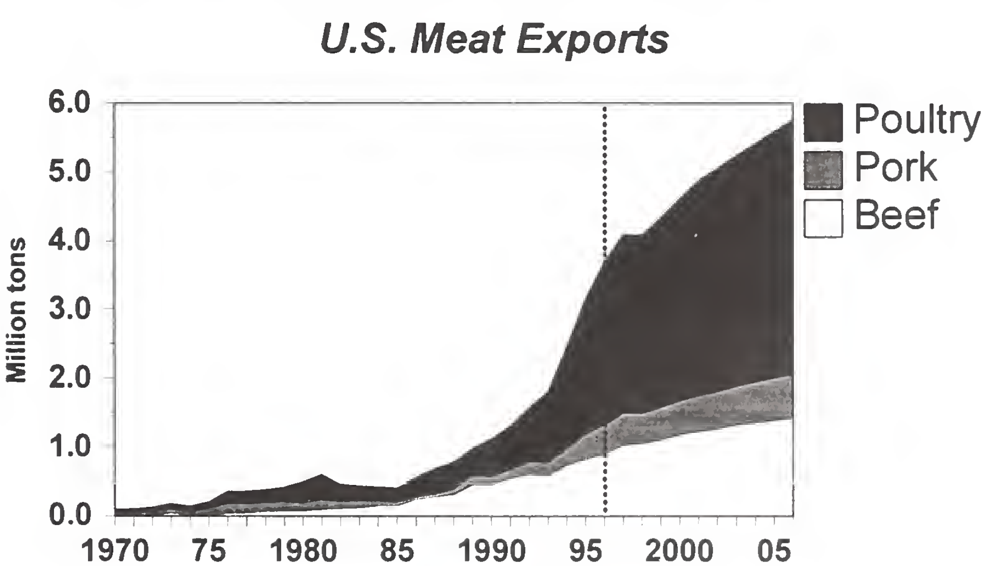


Figure 23. World Cotton Imports

China, Southeast Asia & L. America account for most growth, as spinning shifts to low wage areas...

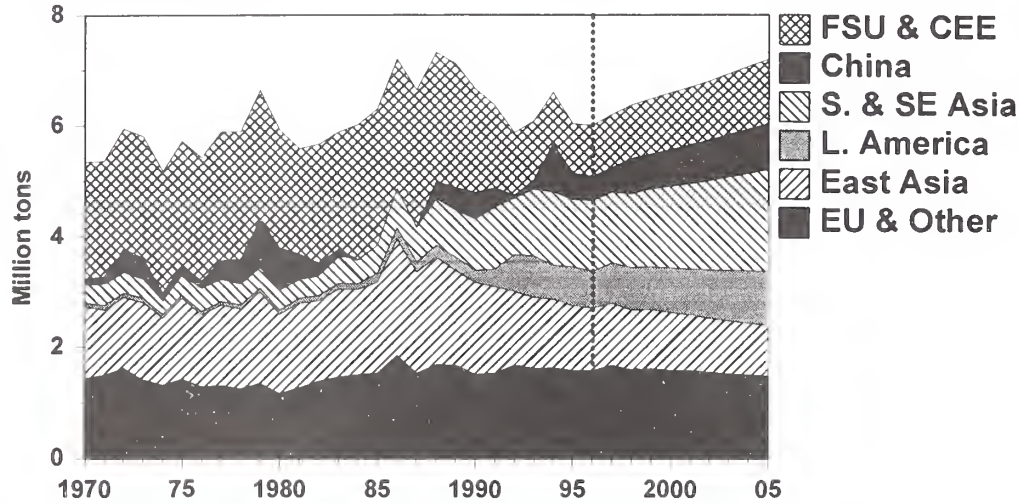


Figure 24. U.S. Agricultural Export Projections

- HVP exports continue to outpace bulk
  - Demand from Asia & NAFTA
  - U.S highly competitive
  - But, <u>*assume no new market openings*</u>
- Bulk exports strengthen
  - LDC demand
  - Firmer prices
  - Less EU competition
- U.S. exports near <u>*$80 billion*</u> in 2005

U.S. Export Value Growth Rates (%)

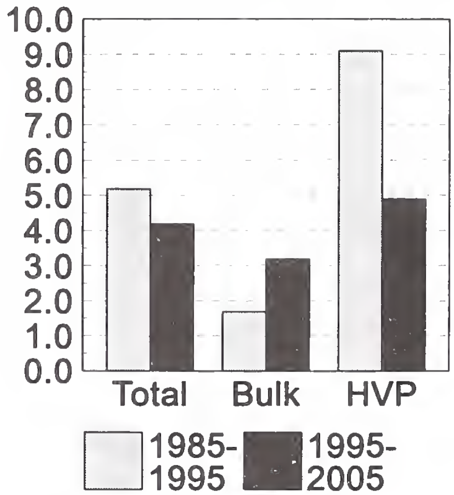


Figure 25. U.S. HVP Export Projections

- Robust, but slower growth in meat & horticultural exports expected
- East Asia & NAFTA lead growth
- U.S. competitive
- But, we assume no major new market openings

U.S. Export Value Growth Rates (%)

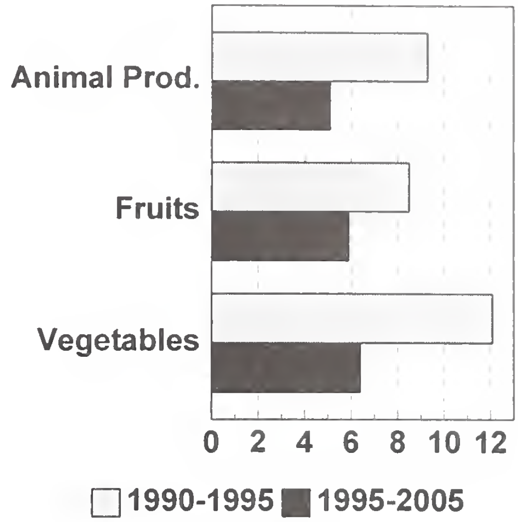
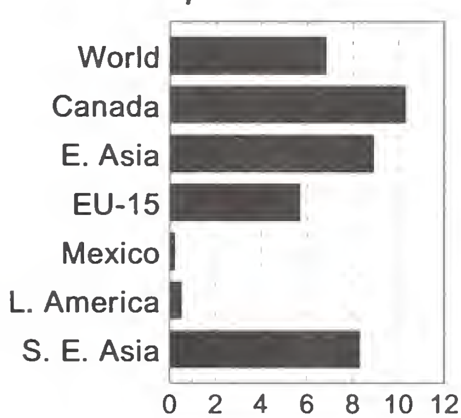


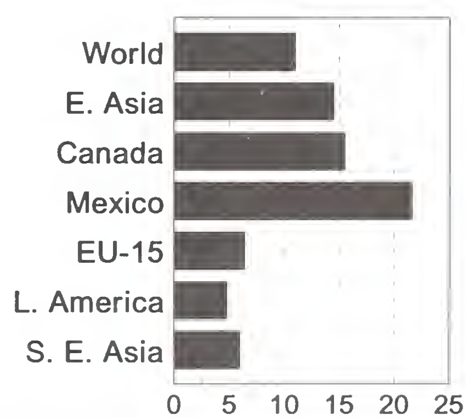
Figure 26. U.S. HVP Export Growth Fastest Where Markets Have Opened

Historical U.S. export growth rates...

Consumer-Ready Unprocessed

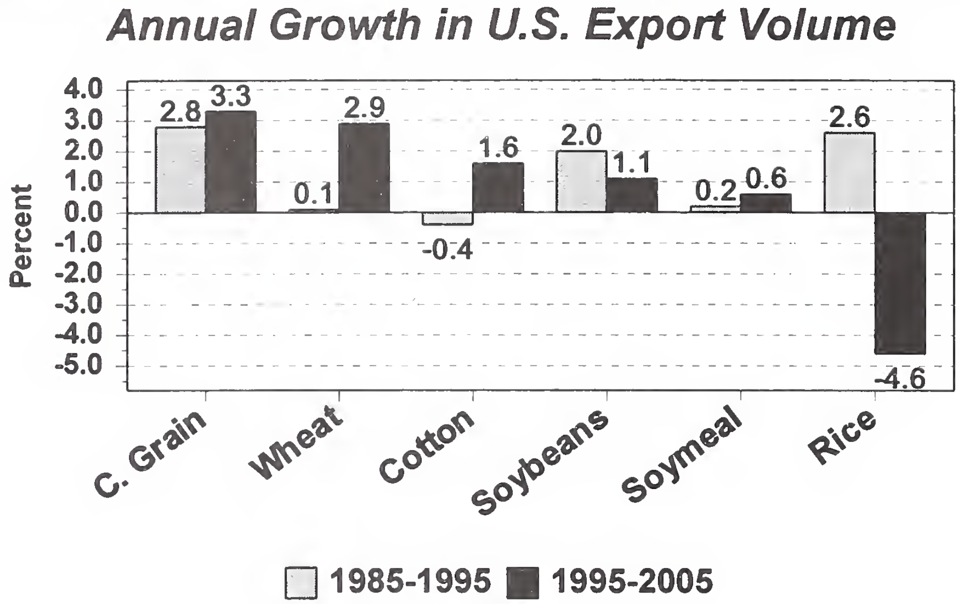


Consumer-Ready Processed



Ranked by market size.

Figure 27. U.S. Bulk Commodity Export Projections



The Long-Term Outlook For United States Agriculture
A Food And Agricultural Policy Research Institute Response

Robert E. Young II[1]

To say that there are similarities between the USDA long-term outlook and that developed by the FAPRI group would be an understatement. This is probably best exemplified by looking at a few of the standard aggregate measures. USDA expects the value of agricultural exports to reach $80 billion by 2005. They look for total corn utilization in 2005 to reach 10.8 billion bushels while we suggest 10.9 billion bushels in the same year. We are a little stronger in overall meat exports from the United States, particularly for beef, but are within 5 to 6% of each other on broiler exports by the end of the projection period.

Even in the details there are remarkable areas where we are telling the same story. Take rice as an example. Both USDA and ourselves expect rice exports to come under pressure due mainly to strong domestic utilization that limits exportable supplies from the United States. Exactly the same story in both baselines. We even have the same story with respect to the European Union and their handling of export subsidies, although we will confess to being converted to that story well after the USDA folks had already arrived. They are much stronger on overall world wheat trade than our analysis suggests.

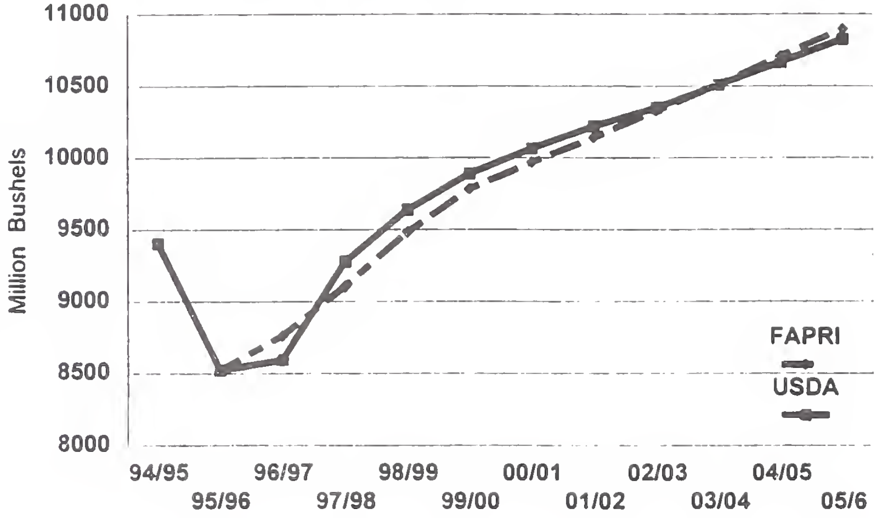
There are some specific areas of disagreement. USDA seems to think that the next cattle cycle will not begin its next turn until after 2005 and that cattle prices will never turn down again. (Calf prices do back down in 2001, but finished animal prices grow throughout their baseline). Their hog inventory is remarkably stable from 2000 on. The biggest year-to-year change in that period being 0.6 percent. We have quite a bit of additional movement in these sectors that reflects more traditional cyclical behavior on the livestock side.

There are some aggregates where we have differences. USDA expects net farm income of $39.3 billion in 2000 and $45.9 billion in 2005. We suggest income levels of $52.6 billion and $52.9 billion in the same years. They have higher gross cash receipts, but not surprisingly, much higher costs. While it is difficult with the information provided to uncover all of the causes for these differences, it is likely that this is where the stronger wheat demand and more steady cattle and hog picture come into play.

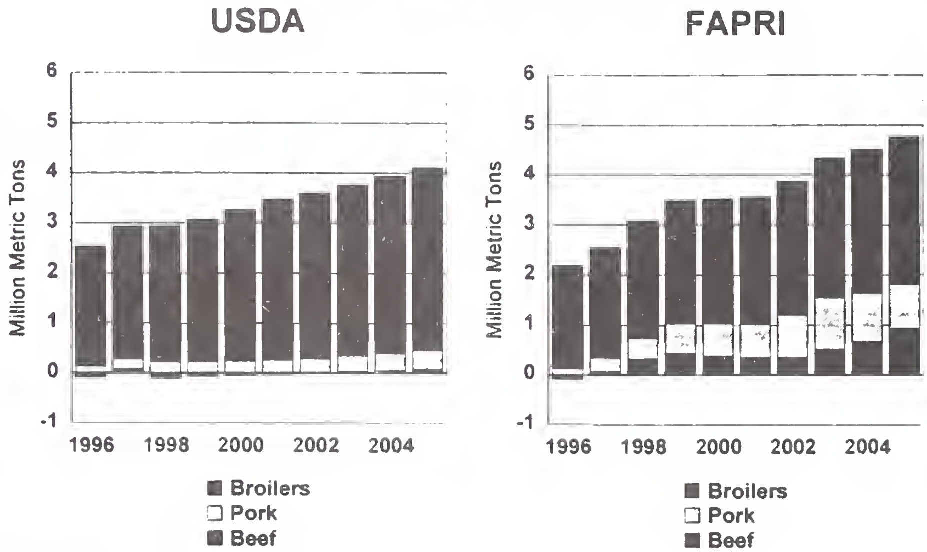
It is not the intent of this paper however to go into all of the minutia of differences between the two baselines. As mentioned at the outset, the overall tone of this pair of baselines is remarkably similar. We put together a set of bullets around our baseline without having seen the USDA document, and even the detail on our respective stories on why the growth in demand is expected to occur are remarkably similar. Instead of focusing on the differences or similarities, let us instead look to the causes.

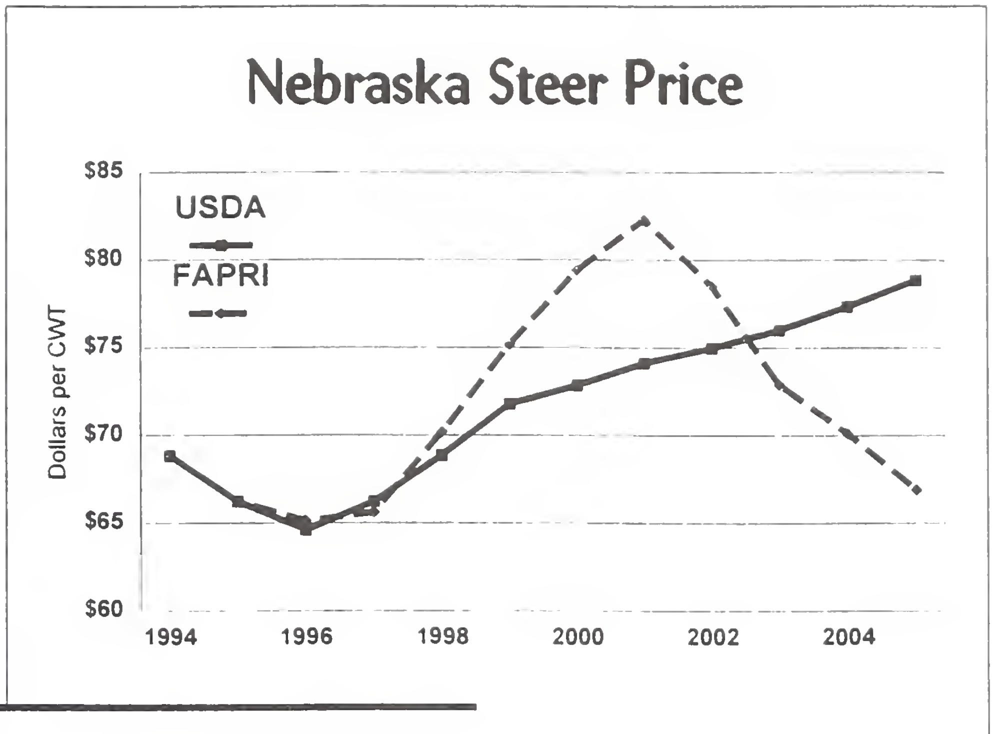
[1]Co-Director, Food and Agricutlural Policy Research Institute at the University of Missouri

United States Corn Utilization

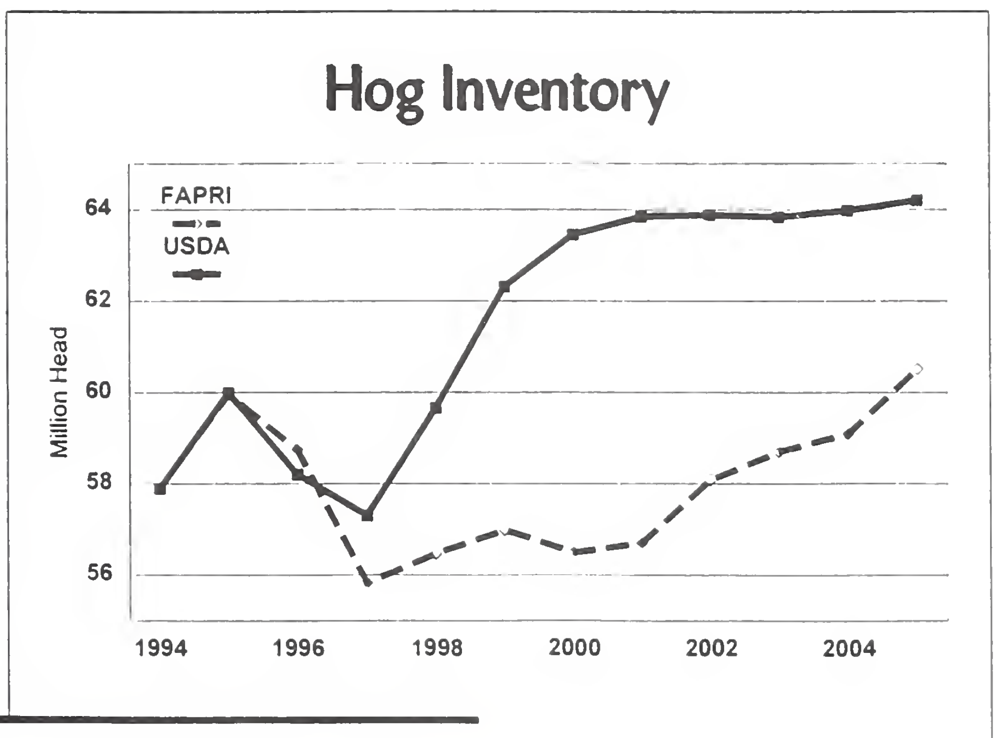


U.S. Meat Exports





Nebraska Steer Price
$85
$80
$75
$70
$65
$60
Dollars per CWT
USDA
FAPRI
1994
1996
1998
2000
2002
2004



Hog Inventory
64
62
60
58
56
Million Head
FAPRI
USDA
1994
1996
1998
2000
2002
2004

The driving factor in both outlooks are the macroeconomic projections for the developing economies -- those economies with per capita incomes in the $500 to $10,000 per capita range. Both groups include projections that expect the economies in these countries to grow fairly sharply. Both groups expect that the income elasticity for food demand in these countries is fairly high. Both expect a significant portion of this higher income to move to meat demand. Both baselines are herded, prodded, motivated and moved by this factor. Even the stories that are told for the non-feed grain/protein meal/meats sectors are based on how well these other commodities perform relative to this demand pull picture.

Usually in making economic forecasts of this type, one gets very concerned when there is this much agreement. If one finds this many economists all telling the same story, then clearly something must be wrong. While there may be a paucity of 'other-hands' in this case, there may actually be more reasons to think that we are both right on this outlook than to think we are wrong.
If one takes the economic growth projections as given, then the rest of the baseline follows so the question becomes, how realistic are those expectations? The causes of this underlying economic growth can be traced to many factors. Stable political structures in several of these countries. Fairly stable economic growth in many of the developed economies providing an engine for the less developed countries. Many of the economic reforms advocated by outside agencies like the Bank or the International Monetary Fund finally beginning to pay off as these developing countries institute changes and are watching inflation rates for example move into more manageable levels. It is doubtful that anyone who has lived in the United States over the last twenty-five years fully realizes what it is like to survive with 1000% inflation rates, or currencies that have to be completely changed every four or five years just to limit the number of zeros. Bringing these kind of economies under control has benefits which may take a while to filter through the entire society, but over the long-haul -- assuming the political will remains in place to sustain the reforms -- there will likely be significant improvement in many of these economies.

Another of the major causes of this growth in developing economies must be viewed as coming from trade. Look at the value of world exports over the last thirty years. There have been sharp increases in the value of trade twice before we got to this recent surge. Both of those spikes were brought about through major oil price shocks. Once the markets reacted to the cartels and mid-east crisis, in both cases the level of world trade returned to essentially trend levels. World trade has increased steadily since the mid 1980's without an oil shock. The growth rate since 1993 has been phenomenal. While the rate of growth has slowed somewhat in recent months, this surge was based on market to market trades, not on some external, temporary shock.

Why would one expect this picture of economic growth to change. The Economist lately ran a piece on why some countries, particularly in Latin America, may be facing challenges to continued reform. Actions in several locations in the formerly centrally planned economies are also having a difficult time effecting the full measure of market reform. But the inevitability of trade reform brought on by the GATT/WTO structure as well as any number of regional or bi-lateral arrangements probably makes this growth in world trade the baseline from which we will all need to operate from. A baseline from which it will take a great deal of discussion to justify movement.

The recent Project Link forecast suggests that countries with per capita incomes of less than $10,000 in 1990 will see a real increase in economic activity in 2005 that will be nearly $4 Trillion higher in real

terms than was the case in 1995. These are countries with fairly high income elasticities with respect to their diets in general, and with regard to meats in particular.

To make the case that the United States is probably the best positioned to supply these meat and feed grain needs to this growing world middle class is not difficult. The natural resources are here, the infrastructure is here and just as important, the policies are now here. It should not be a shock to anyone here that our producers will make decisions in a much different manner in the future than they have in the past. With respect to production decisions however, they could not be situated any better than they are now. The FAIR act will allow producers to move to market signals without being concerned about base protection. Add all those factors into the equation and you are hard pressed to determine who else can step to the plate in a similar manner.

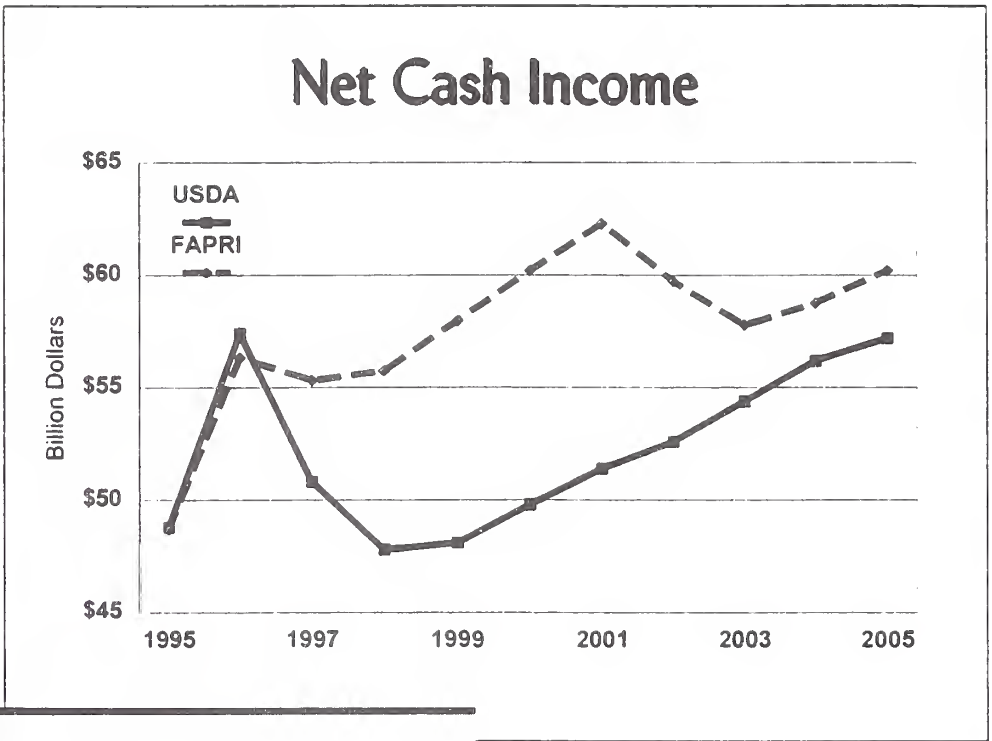
Having given all of this justification, there is one area where it is quite likely both USDA and FAPRI are wrong -- stock holding.

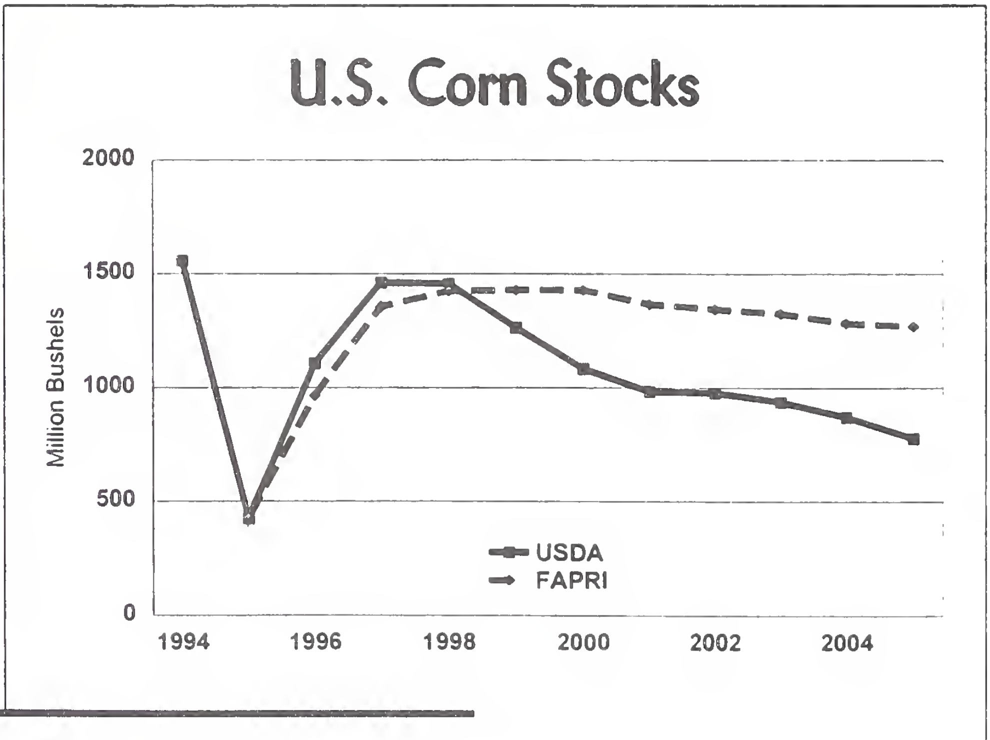
While we have been moving away from government participation in the stockholding of grains, oilseeds and even dairy products for some time, the final nails were pounded home with the 1996 Act. The elimination of the Farmer Owned Reserve, extension of marketing loans to all program commodities and loan rate levels places us in a position where it will almost require USDA to go directly on the market to purchase grain. The CCC charter act gives broad authority, and while even that capability could probably be found somewnere, surely no one here expects that kind of acquisition to occur.

We are on a path where the market will hold all of our stocks. This implies a learning curve relative to where we have been in the past, lessons which we as analysts and we as consumers and producers are still in the process of understanding. But the lessons will be learned. The cotton and rice markets went through their own learning processes when they shifted to marketing loans and got rid of government stocks. The difference for the feed grain complex however is the cost of learning these lessons. The payee in this case will likely be both the crops and the livestock producer, not to mention the lowly commodity analyst. We will probably all miss this behavior once or twice in the next few years. USDA has a much different view of this stock-holding behavior that we do, particularly in the wheat and feed grain complex. They also seem to have a different approach to producer planting decisions and market price movements.

In the end, we all know that the specifics of both baselines will be wrong. Numerous other factors that will make the probability that either one will be correct in all respects at exactly zero. USDA discusses weather induced yield shocks. This will clearly be the largest factor, but there are others. The assumptions about the rate of technology change could lead to substantial differences. Some of the causes for these variations may have nothing to do with science, but rather with regard to intellectual property rights.

All things considered though, one has to be fairly optimistic about agriculture in the United States. We will go through some challenges in the next couple years. It is difficult for many cattle producers for example to get excited about finished animal prices in the low 60's, or wheat prices below $3.50 per bushel. But this is a long-term baseline. And it may be that under the terms described in both of these baselines, we just might still be alive in the long-term.


Net Cash Income
$65
$60
$55
$50
$45
Billion Dollars
USDA
FAPRI
1995
1997
1999
2001
2003
2005


U.S. Corn Stocks
2000
1500
1000
500
0
Million Bushels
USDA
FAPRI
1994
1996
1998
2000
2002
2004

THE REGULATORY APPROVAL PROCESS FOR GENETICALLY MODIFIED PRODUCTS

John H. Payne
Director, Biotechnology and Scientific Services
Animal and Plant Health Inspection Service, USDA

Good morning. It's a pleasure to be here with you today to take part in this Agricultural Outlook Forum and to bring you an update on biotechnology processes. For the next few minutes, I would like to offer a broad perspective on our commitment to regulating agricultural biotechnology in a flexible, straightforward, and science-based manner.

USDA'S REGULATION OF PLANT BIOTECHNOLOGY

In developing USDA's first plant biotechnology regulations in 1987, the Animal and Plant Health Inspection Service (APHIS) dedicated itself to making the regulatory structure for these commodities flexible and customer-oriented. At the same time, we at USDA have remained steadfastly committed to ensuring that plant health in the United States is protected while allowing the safe field testing or release into the environment of genetically modified plants. Long ago, we recognized that biotechnology is evolving rapidly and that oversight structures should be able to assure safety while still facilitating technology development and use. After all, as in many other high-tech industries, regulations are a critical determinant of the time and the cost involved in bringing a genetically modified product to market. For agricultural biotechnology, innovative and risk-based regulations mean less burdensome costs for producers and more competitive positioning in the marketplace.

Moreover, if structured and administered properly, regulations can actually facilitate rather than impede the commercialization of agricultural biotechnology products by providing potential consumers with the assurances they need to accept such products. At the same time, such regulations are able to prevent or at least mitigate risks without inhibiting innovation and product development. To this end, our goal in USDA has been to develop regulations that neither over-regulate nor under-regulate.

In doing so, we have worked to ensure that our regulatory structure adequately considers health and environmental safety issues as biotechnology products are transferred from the laboratory, to the field, to the marketplace. Toward this end, we have used statutory authorities that already existed for protecting plant and animal health--rather than adding additional laws to the U.S. Government's books. We have also exercised oversight for biotechnology on a product-by-product basis--rather than evaluating all genetically modified products in the same manner regardless of what is being modified or the type of modification. This type of regulation enables

us to consider each product individually and to develop safeguards that are specialized to its individual risks.

Our rational and science-based approach also incorporates the use of performance standards, rather than design standards. In USDA, we have recognized their application to biotechnology for many years. Simply put, performance standards focus on results. For biotechnology, this means setting specific safety standards that biotechnology producers must meet before we will allow their products to be imported, moved interstate, or field tested.

Biotechnology developers must certify to APHIS that they have met these requirements. However--unlike design standards that stipulate in detail how developers must meet the requirements--performance standards let producers decide the best way to achieve compliance with the regulations. Accordingly, developers are given the flexibility needed to reduce their costs while still meeting our regulatory requirements, and--perhaps more importantly--safety is not compromised.

A major feature of the regulatory process has been our cooperative relationship with other Federal agencies as mandated by Federal policy under the coordinated framework for biotechnology regulation. We value our ability to consult with officials at the U.S. Environmental Protection Agency and the Food and Drug Administration on issues of joint concern and we continue to discuss common issues with these agencies.

These are the basic principles of USDA's regulatory program. With that overview let me describe the regulatory process in practice. In brief, we use three separate but interconnected processes: a permit process, a notification process, and a petition process. Each of these processes offers applicants with alternatives in conducting their research and still ensure the safety of plant health in the United States.

The permit process is the oldest of our regulatory procedures--it dates back to the development of APHIS' original biotechnology regulations in 1987. Under this process, applicants provide us with extensive information on their product and the safeguards they will take to ensure that the product is safe for movement or field testing. APHIS officials, in turn, review this information and determine whether to approve the proposal. In doing so, they may prepare environmental assessments or risk assessments, if necessary. Accordingly, when a permit is granted for the movement or field testing of a genetically modified organism, we are assured that the proposed release of the organism does not present a risk to agriculture or the environment.

As I noted earlier, regulations should adapt--as necessary--to increased experience about a given technology. As we learned more about the movement and field testing of certain genetically modified plants, such as tomatoes, we realized that it might not be necessary to subject these products to the extensive review of the permit process. Accordingly, we developed the notification process in 1993.

The notification process currently applies to only six plants: tomatoes, potatoes, corn, cotton, tobacco, and soybeans--all of which have been tested extensively since the late 1980's and about which we obtained a large body of knowledge. As a result, we do not require applicants to submit their research protocols or other documents pertaining to the way in which they will ensure the safe movement or field testing of these products. Rather, the applicants certify that they have met our established eligibility criteria for the type of modification to the plant, as well as our performance standards for the confinement of the crop plants.

We also reserve the right to inspect the applicants' facilities and records if necessary to ensure they are operating within the law. In doing so, we ensure the continued safety of U.S. plant health while offering biotechnology companies and other researchers with more freedom in bringing new products into the marketplace.

As I noted, the basis for the notification process was increased knowledge and experience with regard to the movement and field testing of certain genetically modified products. To aid in moving products forward based on increased knowledge, APHIS also formalized the petition process in 1993. Under the petition process, we make decisions on whether to deregulate genetically modified products. Accordingly, we require petitioners to submit, among other things: a biological description of the plant being modified and the changes that have been made to it, and also extensive data from their experiments. In addition, we always require petitioners to supply any unfavorable information, that is, any information that indicates that the regulated article may pose a greater plant pest risk than its nonmodified counterpart.

We announce receipt of petitions to the public and allow time for any interested party to comment. In turn, we review all the information, prepare an environmental assessment, and make an official determination as to whether the product should be deregulated. We wish to be certain that the plant poses no risks to plant health and is as safe to grow as nonengineered varieties of the same plant. If we decide that a product should be deregulated, we also publicly announce our decision, making sure that the views of all concerned parties are addressed.

We have also deregulated 23 products, and we are currently considering 6 more for deregulation. Some of these products are fairly well known, such as Calgene's Flavr Savr tomato, which was genetically modified for delayed softening. The Flavr Savr tomato was the first product approved for deregulation in late 1992.

With these three separate processes, we feel our regulatory oversight system adequately protects agriculture and the environment while creating a strong regulatory framework for the development and application of biotechnology. However, we never stop looking for ways to make our regulations more flexible and customer-oriented.

Accordingly, in August 1995, we published a proposal that would extend the notification process to most plant species. The proposal, if finalized, would also streamline the review process for deregulating certain genetically modified products that significantly resemble other previously

deregulated products. For example, if a genetic modification were put into "big boy" tomatoes, and we deregulated them, we would simplify the process of deregulating the same change when put into "beefsteak" tomatoes.

In addition, the proposal would lessen the paperwork requirements for certain applicants and would enable us to develop guidelines that would provide helpful information to developers of genetically modified plant products. Such guidelines could pertain to research protocols and practices or other matters. However, they would all be aimed at helping developers comply with our regulations--not to hinder their research activities.

We are still considering the comments we received on this proposal to determine how to proceed. In the meantime, we continue to review applications for permits and notifications--as well as petitions to deregulate genetically modified products.

INTERNATIONAL HARMONIZATION EFFORTS

In this regard, we have established three broad goals for the international harmonization of regulations for genetically modified products. First, we will seek to ensure the integration of compatible national approaches. This means we will work with other countries to identify the common aspects of our regulatory systems. In doing so, we can build confidence in each other's review processes and work to extend existing regulatory approaches for traditional plant products to new, genetically modified products.

Second, we will work with other countries to ensure that our different national regulatory approaches are coordinated. Toward this end, we will work in bilateral and multilateral forums, such as the Organization for Economic Cooperation and Development (OECD) and the Asia Pacific Economic Cooperation (APEC), to exchange information on how reviews of genetically modified plants are being conducted and on products being researched.

We will also continue to make important information about our regulatory system and about U.S. biotechnology developers available on APHIS' homepage on the Internet. Among other things, APHIS lists information on products that are currently being field tested and products that have already been deregulated. We believe that all of these information-exchange efforts provide an essential, informal "early warning system" on global issues that may arise regarding products nearing commercialization.

Third, we will work to ensure that scientific principles are used in evaluating genetically modified products. As I noted earlier, we have strived to base our review system on rational, science-based regulations. Under recent trade agreements, this regulatory approach has been further supported at the international level. Accordingly, we will continue to make sound science the basis for our international negotiations.

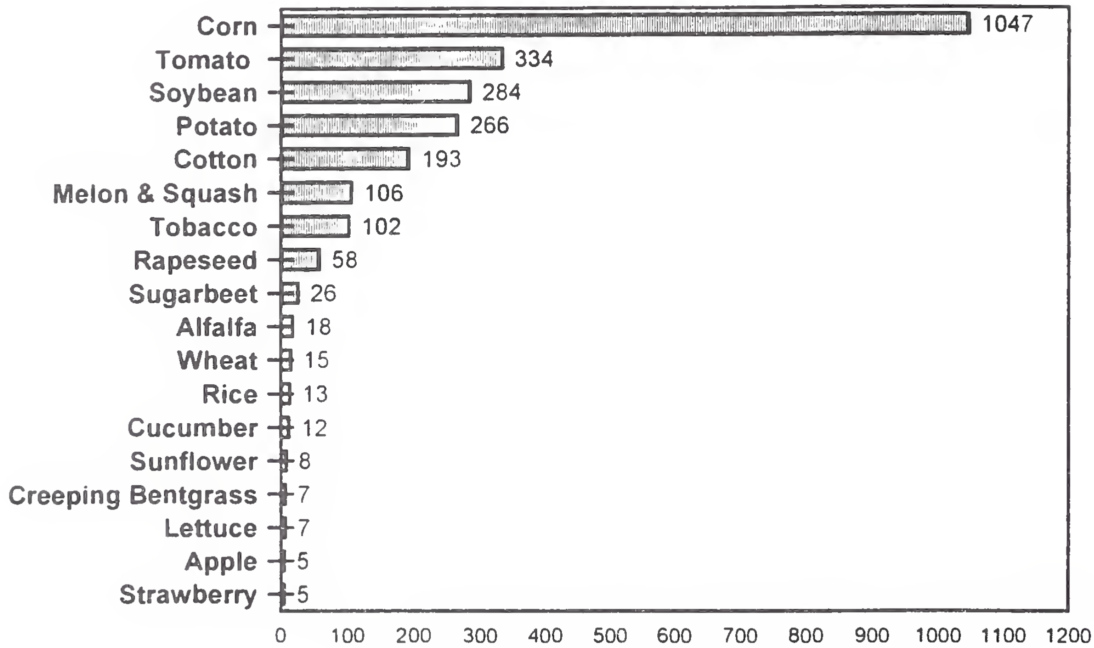
In the future, we will continue to work with OECD, APEC, and other international organizations--as well as individual nations--to promote the concepts of compatible regulatory approaches, coordination of such approaches, and reliance on sound science. We believe these principles are essential to moving genetically modified products safely in international commerce.

CONCLUSION

This morning, I have presented USDA's approach to regulating biotechnology, and I have spoken about our commitment to developing and enforcing rational, science-based regulations. I have also discussed how these regulations fit into the broader context of our efforts in the international arena and our efforts to make the regulations more flexible, efficient, and results-oriented. In doing so, I have sought to demonstrate how we constantly look for new and innovative ways to enable our biotechnology oversight system to protect U.S. agricultural health without impeding progress. Safety has and will continue to be our top priority in regulating this industry. We are confident, however, that safety can be achieved, while allowing important new agricultural products to come to the marketplace.

Thank you.

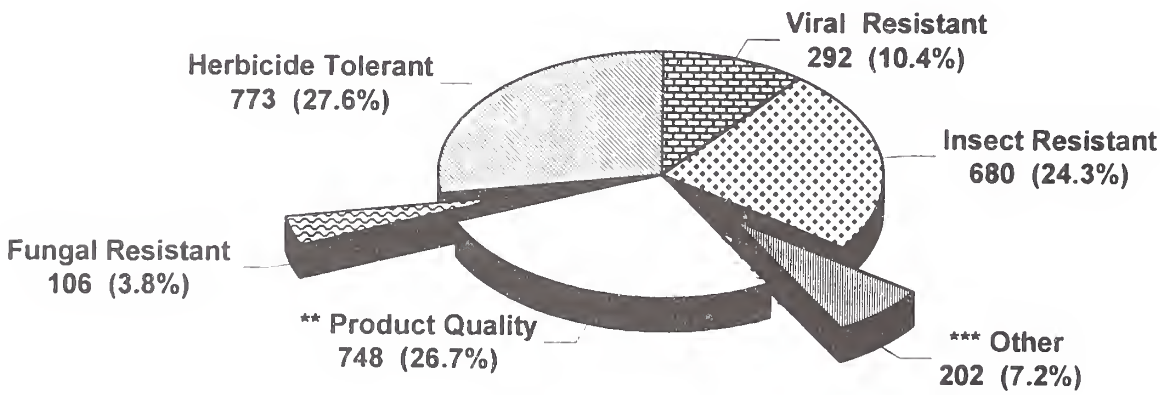
Field Releases* : Most Frequent Crops 1987 to 1/31/97



** Permits and Notifications*

2/7/97

Field Releases* : Most Frequent Categories 1987 to 1997 (1/31/97)



** Permits Issued and Notifications Acknowledged*

*** = Agronomic Properties*
**** = Marker Genes , Selectable Markers, Bacterial Resistant and Nematode Resistant*

2/7/97

Petitions: Determination of Non-Regulated Status Approved 1992 - 1995 : (1 of 2 Slides)

Approved Date	Applicant	Crop	Phenotype
10/19/92	Calgene	Tomato	Fruit ripening
02/05/94	Calgene	Cotton	Herbicide Tolerant
05/19/94	Monsanto	Soybean	Herbicide Tolerant
10/31/94	Calgene	Rapeseed/Canola	Oil profile
12/07/94	Upjohn	Squash	Virus Resistant
1/17/95	DNA Plant Technology	Tomato	Fruit ripening
3/02/95	Monsanto	Potato	Insect Resistant
5/17/95	Ciba-Geigy	Corn	Insect Resistant
6/06/95	Zeneca & Petoseed	Tomato	Fruit ripening
6/22/95	AgrEvo	Corn	Herbicide Tolerant
6/22/95	Monsanto	Cotton	Insect Resistant
7/11/95	Monsanto	Cotton	Herbicide Tolerant
8/22/95	Monsanto	Corn	Insect Resistant
9/27/95	Monsanto	Tomato	Fruit ripening
12/19/95	DeKalb	Corn	Herbicide Tolerant

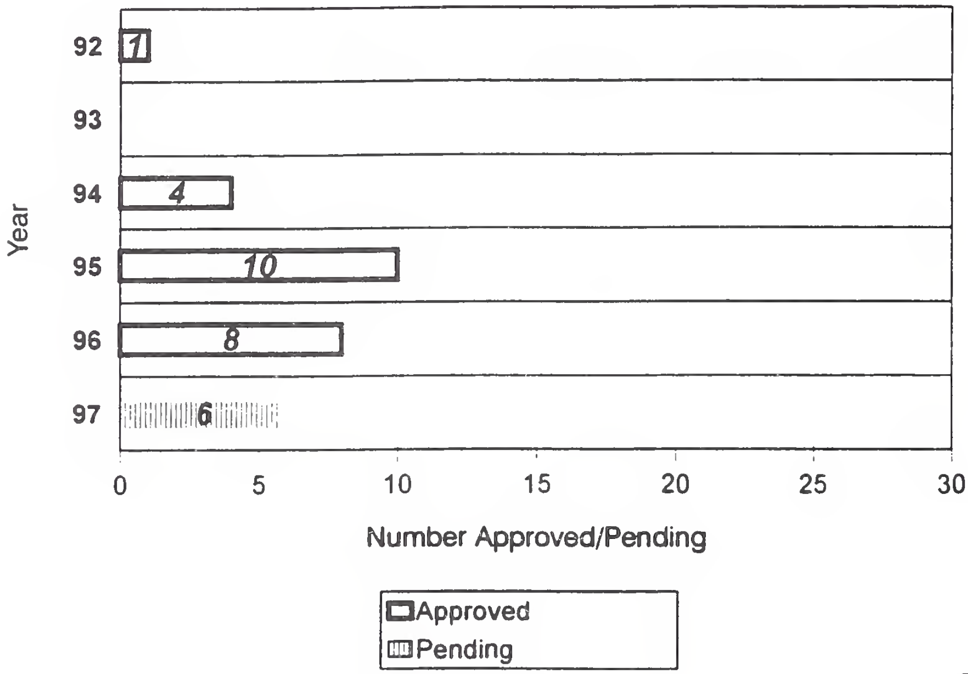
2/7/97

Petitions: Determination of Non-Regulated Status Approved 1996 : (2 of 2 Slides) as of 1/31/97

Approved Date	Applicant	Crop	Phenotype
1/18/96	Northrup-King	Corn	Insect Resistant
1/26/96	Du Pont	Cotton	Herbicide Tolerant
2/22/96	Plant Genetic Systems	Corn	Male sterility + Herbicide Tolerant
3/27/96	Agritope	Tomato	Fruit ripening
5/3/96	Monsanto	Potato	Insect Resistant
6/14/96	Asgrow	Squash	Virus Resistant
7/31/96	AgrEvo	Soybean	Herbicide Tolerant
9/5/96	Cornell U & U of Hawaii	Papaya	Virus Resistant

2/7/97

Petitions: Determination of Nonregulated Status approved and pending: as of 1/31/97



2/7/97

Petitions: Determination of Non-Regulated Status Pending Status : as of 1/31/97

Received Date	Applicant	Crop	Phenotype
9/3/96	*Calgene*	*Tomato*	*Fruit Ripening*
10/17/96	*DeKalb*	*Corn*	*Insect Resistant*
11/12/96	*Monsanto*	*Corn*	*Herbicide Tolerant & Insect Resistant*
11/12/96	*Monsanto*	*Corn*	*Herbicide Tolerant*
1/08/97	*DuPont*	*Soybean*	*Oil Profile*
1/13/97	*Calgene*	*Cotton*	*Insect Resistant & Herbicide Tolerant*

2/7/97

Utility Patents and Agricultural Biotechnology[1]

Richard M. Parry, Jr.
Assistant Administrator for Technology Transfer
Agricultural Research Service, U.S. Department of Agriculture

Plant breeders can be justifiably proud of the accomplishments they have made over the past 40 years. All of the major agricultural crops show large increases in yield. One has only to plot increased yields over years to gain an appreciation of the steady growth that has occurred. It is no wonder that the USA has fewer farmers to feed our people than any other country in the world. Recent estimates show that only 2% of the people produce the food and fiber to take care of our needs and have additional produce to export. American agriculture is a great success story.

Of course, great strides have been made in enhancing cultural practices during this same period and such improvements have helped increase yields. But conservative estimates attribute more than 60% of yield increases during the last four decades to improvements through breeding.

The creation of these new varieties has played a major role through the years in helping U.S. farmers maintain their economic competiveness. In corn alone, average yields have increased from 39.7 bushels per acre in 1950 to 106.5 bushels per acre in 1990--a total increase of 168.3%. Similarly, wheat yields have risen from 16.5 bushels per acre in 1950 to 35.4 bushels per acre just 40 years later, in 1990--a 114.5% increase.

If farmers were dependent today on the increases due only to cultivation improvements, they would not be able to survive in the current economic times. Overall production costs have risen, so it has become essential to the competitiveness and economic viability of our farmers that cost per unit of yield decrease.

Recently, plant research has undergone another revolution. In 1970, it was a discipline that, while important, moved relatively slowly and seldom made headlines. Today, it is a field abuzz with rapid innovation, where basic research is transformed into commercial products seemingly overnight and bragging about crop varieties has moved from the seed catalog to the courtroom. And with this success has come a growing tension over how knowledge in this quickly changing field should be generated and shared.

[1] Presented at the Agricultural Outlook Forum '97 at a symposium on New Crop Production Technologies, February 25, 1997.

Two key factors have contributed to the great excitement challenges and controversy seen in agricultural biotechnology today. But it was a 1985 court decision in "Ex Parte Hibberd" (227 USPQ 443) that forms the legal basis for plant utility patents.

First is the discovery and application of molecular biology to plant genetics. Using the tools of genetic engineering, scientists introduce genes into plant far more quickly than was possible with classical genetics.

Second - New federal patent laws and court interpretations have greatly strengthened intellectual property protection available for plants that extend utility patents to these materials. Protection of vegetative material through plant patents became available in 1930 and Plant Variety Protection was granted in 1970.

Intellectual property protection offered by utility patents has stimulated significant investment in agricultural biotechnology by the private sector. Also many competing patents have been filed by companies which has led to many law suits and technology buy outs as the businesses restructure to benefit from promising commercial opportunities in agricultural biotechnology.

However, the field of science is so new it is difficult to establish the value of the technology in the marketplace. Making comparisons to the pharmaceutical industry financial success to agriculture does not work - although the financial uncertainty of the early drug biotech companies of a few years ago has certain parallels.

Commercial development - as well as research - of genetically engineered plants requires access to many components that form part of the improved plants, such as the gene of specific interest, its promoter, enhancing sequence, a transformation system as well as a marker or two to track expression. These components may be subject of patents owned by different groups, which leads to separate negotiations for the use of each, with each payment stacking onto the royalty payments. This market place creates great incentives for cross licensing, buy outs and competing claims. Until there is more interpretation of gene ownership by the courts, especially in broad patent claims for an entire crop - such as genetically engineered cotton, financially uncertainty will prevail.

The actual market value of agricultural biotechnology will be seen in discoveries still in the laboratory. Genes are being discovered that can offer new methods to increase pest resistance, boost yield, and enhance the value of the grain products that meet specific requirements for food, feed or manufacturing uses.

Scientists at University and Government laboratories are now using utility patents to capture value from biotechnology inventions. Since this value is only realized in the commercial marketplace, it is necessary to form partnerships with private sector companies using methods such as Cooperative Research and Development Agreements (CRADAs) to develop the technology. The agreements have significantly reduced the development time for discoveries in agricultural biotechnology as well as other fields by bringing technical expertise and business experience together in the development process.

Because the commercial promise of biotechnology can be enhanced through intellectual property protection, significant changes in attitudes by the public sector scientists and institutions is required where open communication is a valued component of the scientific process. Achieving the appropriate balance between the free exchange of research ideas and the demands for secrecy in a competitive marketplace, which can lead to trade secrets, necessitates a reevaluation of how the scientist manages new discoveries. Patents provide a useful protection against the stagnation of trade secrets by fully disclosing the invention, which in turn stimulates further improvements through additional research. The sacrifice of delaying publication of new discoveries to preserve patent protection can be a problem for the scientist who is unfamiliar with the intellectual property process. However, the frustrations of losing credit or reward from new discoveries in a highly competitive field such as biotechnology makes patents a good alternative.

The proliferation of public-private research and development partnerships will enhance the competitiveness of U.S. agriculture in the global marketplace. The synergy of teaming short term commercial application with the longer range vision of strategic discovery research has already resulted in accelerated development of new crops and added value to the producer. A key ingredient in this scenario will be the public sector focus on transferring the technology for its practical application rather than attempting to become transformed into a competing commercial enterprise.

In conclusion, agricultural biotechnology has finally arrived in the marketplace riding on the crest of utility patents. The performance of genetically engineered crops in the 1996 season have given an indication of their value in the marketplace which will keep demand high into the future. The promising start has promoted a complete restructuring of the agricultural businesses as litigation, buy outs, and technology swaps become daily occurrences. Plant utility patents have become a critical component in this restructuring making ownership disputes vitally important for commercial rights. The contribution of public sector research to agricultural biotechnology has led to more partnerships with businesses that result in rapid development of new technologies. The future growth of biotechnology will continue to rely on the protection of patents for this accelerated development and eventually lead to a wide variety of "designer plants" to fit the demands of the marketplace.

CONSUMER PERSPECTIVES ON FOOD BIOTECHNOLOGY

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Library of Congress

You will note that I have taken the liberty of changing the title of my presentation. The subtitle would be, in typical Washington parlance, what did the public know and when did they know it?

Any emerging technology, if isolated and considered out of context, will tend to confuse and overwhelm consumers. Biotechnology needs to be examined in terms of the real choices that will be offered to consumers around the world. Only when new products are described in real terms and compared with familiar products, can consumers appreciate the benefits the new products may have and the choices they offer.

Nowhere has this fact been more adequately demonstrated than in the case of food irradiation. The introduction of this new technology into the marketplace was viewed by its opponents as being "dead on arrival". Opponents suggested that consumers would be afraid to purchase foods treated with irradiation in part because the opponents themselves used various scare tactics to "educate" consumers about the new technology. When asked ahead of market introduction, however, consumers were frankly unfamiliar with the process, including what it was and whether they should be concerned about its safety. Once produce was irradiated and marketed in both testing situations and regular retail settings, consumers were choosing irradiated foods over foods that were not treated. To date, the dedicated irradiation processing facilities have been unable to keep up with consumer demand.

In a 1992 nationwide survey conducted by USDA and the North Carolina State University, two out of three consumers surveyed supported the use of biotechnology to produce food. Those who favor using biotechnology believed the benefits will be higher quality and more nutritious food as well as increased food production for a growing world population. More than 70 percent of respondents believed that biotechnology would benefit people like themselves in the next five years. Support for the use of food biotechnology was highest among college-educated persons and those interested in science. Men indicated a greater willingness to buy foods derived through biotechnology than women. These gender differences may be a factor in the future acceptance of food biotechnology products in households where women are the primary food purchasers.

Note: The views expressed in this presentation are those of the author and do not represent the views of the Congressional Research Service or the Library of Congress.

In a 1995 FMI/Prevention Magazine survey, shoppers were asked several questions about biotechnology/genetically engineered foods. Shoppers reported having a strongly positive view of genetically engineered foods. Nearly 80% of consumers surveyed accepted food biotechnology for benefits ranging from lowering the fat content to being naturally resistant to pests.

The evidence to date is that there is little consumer understanding of the process of biotechnology. The term itself is not meaningful or decipherable to the average consumer. Awareness does seem to be influenced by locality: consumers in the Northeast have far less aware of the term and its meaning than those in the midwest farm belt. Probably consumers in midwest and dairy states are more knowledgeable than those in nonagricultural states, because of the use and controversy surrounding the use of BST.

In recent focus groups conducted by the International Food Information Center, consumers considered the FDA Labeling Policy as reasonable at the present time. Consumers reported that they support use of the technique when its benefits are clearly explained to them, presumably elsewhere than on the label. A minority advocates "right to know" labeling so that consumers who wish to avoid products produced by, or containing an ingredient that is produced by, biotechnology can identify this characteristic on the product label or in point of purchase information. Since FDA policy already requires the food label to identify ingredients of food biotechnology when a product contains a food allergen or has been changed substantially, this information should be available to consumers who need it or wish to find it. In the case of allergens, biotechnology may eventually provide allergy experts the key to elimination of allergens from many foods that cause allergic or other sensitivity reactions.

Most consumers have little or no awareness of the products created through genetic engineering that are currently on or will be entering the market in the near future. Most consumers still do not understand much about aspartame and olestra and information on these products has been in the media for quite some time. Whether it is tomatoes, corn, squash or soybean products, healthier cooking oils, insect-resistent cotton, animal-friendly cheese enzyme or herbicide-tolerant crops, consumers were generally out of the information loop at this time. Some consumers have heard the controversy about BST use in milk production or the flavr savr tomato, but generally the media has not been terribly interested in stories about biotechnology engineered food products. Perhaps this lack of interest on the part of the media is a result of the fact that the technology is so new that they are not yet knowledgeable about it or there is little negative to say about the process. The prospects for the year 2000 and beyond are great for engineering improvements in nutrition and health properties, food safety, and environmental protection that once were only the subject of science fiction or the twinkle in a researcher's eye. Yet the benefits will only be so if consumers select and eat these products.

Consumers asked in the IFIC focus groups reported little or no awareness of media or consumer group activism in opposing the use of biotechnology techniques to produce or modify food products. Again, this lack of awareness may be due to lack of media attention to this specific issue or be overshadowed by the greater attention focused on the outbreaks of foodborne illness that have created a sensation as a result of the fatalities. I suspect that the amount of

attention focused on food biotechnology will change following this weekend's announcement of the successful sheep cloning in Scotland. It also proves that you should never write a speech too far in advance.

When consumers were asked about the issues that concerned them, primary concern centered on pesticides when considered among a number of other food safety problems. In fact, the identification of pesticides is not surprising given the number of times that this question has been asked in recent years. Consumers repeatedly seem to report being concerned about the addition of chemicals at any point to the food supply, whether it is as a pesticide or food additive. This perspective is, of course, in significantly different from that of federal food regulatory officials who view the number one food supply safety problem in this country to be foodborne disease. This regulatory view is reinforced by the government's attempt to tackle it through the food safety initiative which was announced by President Clinton in January 1997. This announcement follows on the 1996 decision of the U.S. Department of Agriculture to institute the HAACP system as part of the meat and poultry inspection process in this country. The potential exists that biotechnology will enable farmers to plant herbicide tolerant soybean seeds and naturally pest resistant corn seeds which reduce the use of chemical sprays and improve yields.

The 1992 USDA/NCSU survey revealed the need and eagerness for consumers to learn more about the process. Sixty-six percent of respondents expressed interest in learning more about biotechnology. Public awareness about biotechnology was observed to be as low as traditional agricultural practices involving plant and animal breeding. Most consumers are generally unaware that various forms of biotechnology in food production have been used since the beginning of civilization. To help make informed choices about food biotechnology produced products, consumers will need basic information on food production, biology, risk management and government regulation of food biotechnology.

All in all, consumers need to be aware of any and all new processes that are being used to produce products that are part of the food supply. Consumer education needs to provide information on the benefits and the limitations of any new process or product. Consumers need to understand that no one process or product can solve any and all the problems of food safety or nutrition. Just as food irradiation is not and never can be the answer to food preservation, so food biotechnology is unlikely to be the answer to all issues concerning food production, removal of natural toxins, pesticide use, allergy control, or sound nutrition. But it does offer an exciting opportunity to researchers and policymakers to provide new products in the marketplace. It seems to me that consumers need to be kept apprised of the progress that is being made and the products available to them. Beyond that, consumers will decide what to purchase based on their traditional set of criteria: taste, cost, nutritional value, and perception of safety.

PRECISION FARMING IN THE 1990'S. A FARMER'S PERSPECTIVE

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Much has been written in the past year about agriculture and the fourth revolution. Mechanization, fertilization, seed hybridization and agriculture chemicals have shaped and formed agriculture as we know it. The information revolution will become the agriculture's most productive and challenging revolution yet. Farmers have long recognized that their fields are not homogenous units. They vary in natural and manager induced characteristics and at one time managed accordingly. In the past, agronomic production tools have been developed to manage ever larger fields as homogenous units and the ability to respond to variations within those fields has diminished. Computer and electronic advances will enable farmers to produce their crops more efficiently and with less damage to the environment by managing land in units much smaller than a field. The technology is called site-specific farming (SSF).

New tools

In the very near future, as we purchase new tractors and/or combines these implements will have built in computers. These computers might be as common on the farm as a socket set is today. But it's unrealistic to expect every farmer to be a computer user-unless you assume only computer-using farmers will survive. In a recent article in "Resources" a publication of the American Society of Agricultural Engineers, stated "Most estimates indicate about 40% of farmers own computers. No one really knows how may farmers actually use these computers, or how much". Never the less, today's computer technology comes closer to delivering on promises we farmers perceived over 12 years ago in the infancy of the farm computer age.

Computer platform

Today we perceive the computer technology as our bridge to the future. But if farmers are not familiar with computer usage, the opportunities of this new technology will not be realized. But with adequate working knowledge, the computer has the potential to change how and why we farm.
Early adapters of the computer has found it easier to accept and expand the use of site-specific technology on the farm. These first wave innovators had to learn both the computer and the precision farming methods by the seat of their pants. Most of these farmers integrated hardware and software themselves, or found sources for help.

The next wave of adapters tend to want someone else to run the technology. Their perception is they don't have time or the inclination to perform the required technical computer analysis. The next wave farmers must realize this technology and analysis is no better than the person behind the keyboard of the computer. "Perhaps these next wave farmers want the inspiration without the perspiration." Grant Mangold

New technology?

The newly acquired technology agriculture is now discovering is not new at all. GPS, GIS, remote sensors (satellite and on-the-go) has been used by other industries, especially the military, for nearly two decades. These industries has benefited from the use of these tools greatly. Because of cut back on military spending in the U.S., these other industries had to stretch their horizons to keep their companies viable and agriculture is the beneficiary.

Another reason outside sources perceive this technology as a "god send" are the "farm regulators". The environmental movement today is a driving force behind many governmental decisions. If agriculture is not careful, this new technology could be the undoing of farming as we know today.

Never get lost again

The farm of the future will be "plugged into the planet," both literally and figuratively. Working with GPS and remote sensors, will provide the data to and from the soil to the our data processing center. This same equipment will guide prescriptions aimed at optimizing production from individual field sites. This information conduit will also reach the farm supplier and the farm customer. As the agricultural industry grows this technology each step will dramatically change what we know about what we grow and where it was grown.

Information cycle

Site-specific and information technologies being applied in agriculture today involve the process of turning data into decisions. The data-to-decision process involves four factors:
1. Acquisition of raw data
2. Analysis of information (derived and interpreted data)
3. Addition of knowledge (interpreted and applied data/information)
4. Application of wisdom (desirable end-use of data)

In a typical farm in the upper mid west, this cycle represents one year. It is utmost important a farm operation collects and interprets this data as soon as possible. This typical farm would have some where between 20 and 30 cycles, which may not be enough time to truly understand the variations without the commingling of information with other farmers. Never-the-less harnessing the power of a computer to acquire, analyze and apply information will empower you to understand past performance, as you project and implement strategies to meet economic and environmental objectives for the future of our farm business.

Economic models of the results of computer farming are hard to come by. In part, that's because results are site-specific-and one site will undoubtedly vary from another, depending on history and management.
Most farmers and researchers involved with site-specific technology realize they're collecting data that will be more useful in the future. Aside from record keeping benefits, they expect better models to understand the data and make decisions. Plus, it will take several years to collect data

under different weather conditions. (Of course, by then we will be growing different varieties.)

How precise is to precise?

As we start using precision farming, we are concerned with precision accuracy. GPS is measured in meters (approximately 3.2 feet), accepted accuracy is 1 to 3 meters (unless you want to use parallel swathing, where the accepted accuracy is 1 centimeter or less).
The reason GPS technology need not be more precise is the equipment we use to collect and apply the variability.
* In the case of yield monitors, the width of a combine header today is some where between 18' to 45', and speeds from 2.5 to 6.5 miles per hour, and data collection is every one to three seconds. (On our farm, the small grain yield collection area is approximately 28' by 17.6'.)
* Accepted grid soil sample areas are from 2.5 to 5 acres. Dr. Larry Smith, Northwest Experiment Station of Minnesota, has shown that the variability of soil nutrients within a 3 acre grid looks remarkably similar to the variability in an entire field. Such extreme variability presents significant challenges-not only for precise application devices but also for prescription decision making.
* Application equipment we use could be form 1" to 100' wide. In the case of custom application equipment spreading variable rate fertilizer, depending on speed and boom width, an average precise area could be a 44' by 80' area.

The "precise" in precision farming is not as accurate as we thought. But many site-specific precision farming practitioners follow this information-management model:
1. identify practical variability
2. investigate probable causes
3. instigate possible solutions

Since crop production is complex with numerous variables-and often discover significant variability we should understand "practical variability". Practical variability refers to the level of change which can/should be addressed by our current technology, and will be different for every farm.

Precise device, but no advice?

A prescription assumes consideration of the following;
1. The symptoms are diagnosed by an expert
2. There is a determination of the cause
3. A recommendation of a treatment having known effects
4. And the results are dispensed by a licensed technician.

With today's knowledge, writing precise site-specific prescriptions for sub-field areas presupposed more knowledge and wisdom than most farmers and researchers have. The total understanding of spatial variability and interactions need to be addressed and this understanding, economic or environmental models and be built and used.

Many early adopters of this new farming technology realize that site-specific management needs new and improved models for;
1. spatial variability
2. seed selection
3. fertility recommendations
4. weed control
5. in-season management practices
6. and pre-season strategic management planning

Thus will be the new challenge for crop consultants, industry, and research universities.

Using Our Gray Cells

Will industry design systems that allow farmer intervention, or allow a farmer to make these determinations apart from the "magic black box" (computer)? With all this technology helping us to remain in control? Will industry, or will farmers demand, systems that make us so dependent on high-tech devices that we won't be able to farm without them?

So far, we tend to practice a healthy skepticism, except the sugar beet industry in the Red River Valley of the North. The beet industry is in an excellent position to use the basic technology, with the use of grid soil sampling. The nature of how the grower is paid, and the relationship between nitrate fertilizers and quality, makes this an attractive alternative. The only problem is this;
1. Out of thousands of fields grid soil sampled and variable rate applied, (over 125,000 acres in 1996), several fields have been documented to return a positive result. The results have been noted in the $50 - $75 per acre net return per acre. This may be a substantial return but is it statistically significant?
2. It has been reported, in the fall of 1995, several farmers experienced "sticker shock," with variable rate fertilizer application. These select group of farmers did not understand the consequences of the computer generated application maps. Not knowing the amounts and cost found at the completion of application their total per acre cost of fertilizer was between $52.00 and $63.00 compared to a $15 - $21 normal cost, this will be hard to recover the cost over the next several years.

But what do you do when you're confronted with a computer-generated map of your field, and the "computer says" you should apply x amount of fertilizer in this spot? How can you argue-if you don't know the logic it (it's programmer) used?

Current software does not include a provision for the user to identify the origin and status of the data used to generate the map, let alone the logic. But like a spreadsheet, we should be able to look behind the figure and see the equations used to make the map.

Remote Sensing

The first privately owned hyper-spectral remote imaging satellite is scheduled for launch in 1997. Because of imaging resolution and timeliness, the data coming from this first satellite will have

limited use in ag production decision making but will have unlimited use in production monitoring.

Data from hyper-spectral images (say one with 200+ narrow band channels) is quite impressive. The data produced will allow an individual or organization to learn more about our farming operation than we will ever know. For example, a company could analyze the data to determine what crops are planted, how "productivity" changes during the growing season, what production practices we use, what conservation practices we follow, etc. And all of this on 100' grids. Realistically, there will be more data available than could ever be generated by an individual producer with perfect records and an on-site laboratory.

The data from hyper-spectral images is so comprehensive that one can determine how much residue we left on the soil surface at harvest. This data offers enormous opportunity for misuse.

We shouldn't expect any help from the agribusiness community. The large ag commodity marketing companies will recognize (if they haven't already) that hyper-spectral data will give them almost perfect crop production information in near real-time. It also sets the stage for rapid vertical integration of grain production, especially by groups that can buy exclusive access.

In a recent memo to the Farm Bureau advisory committee stated; "Think that remote imagining's impact is far fetched? In Australia, they are already routinely monitoring range land by satellite on a weekly basis and telling producers when they must reduce herd densities (and to what level) or move the cattle off completely to minimize environmental damage"

Top 12 yield factors

Within precision farming circles, much attention has been placed on fertility as though it plays the most important role. But if you regularly polled several leading universities and industry specialists, they list fertility much lower in priority. According to Mark Flock, Ag Division Director, Bookside Laboratories, Knoxville. OH, has generated a list from "most important" to least important.
1. Drainage (soil moisture & stresses)
2. Crop Variety (disease resistance, root systems, ability to adapt to extreme conditions)
3. Insect/weed problems (nematodes, etc.)
4. Crop rotation (synergistic effect)
5. Tillage (type, timing, wet/dry soil)
6. Compaction
7. pH (liming) (extreme pH variability (<5.5, >7.3))
8. Herbicides (misapplication and drift)
9. Subsoil condition (acid or alkaline subsoil, clay layer, etc.)
10. Fertility placement (ridge-till, no-till, etc.)
11. Fertility
12. Plant population (most fields have a narrow optimum population)

Mark Flock also stated, "This is dynamic, not a static listing."

It is also stated the importance of keeping records - particularly weather records. The "big event" at critical time periods can really mess up herbicide performance, or cause crusting, or interrupt pollination. Weather at critical times will make or break yield - and you need that information when you interpret your yield maps.

Fertility and precision farming

Many farmers believe variable rate fertilization is the key to precision farming. In sugar beet production, variable rate Nitrogen fertilizer may help the quality of the crop. In other crops this may be not true. In a recent article in the "Top Producer", Don Larson was quoted as "Precision farming began as a method to vary application rates of fertilizer." Over several years of this thinking, Larson hasn't fond much return in that. "Our yield maps are showing that agronomically, fertility is simply not the major issue," he says. "We routinely get our highest yields on some of our lowest-fertility areas. We think that water-holding capacity, organic-matter content, pH levels and other soil characteristics are having a greater impact than nutrient level. This makes it difficult to understand why people are spending money on intensive grid soil-sampling programs."

The ultimate challenge will come when we hire agronomists to help explain the differences that are clearly shown on the maps we are suddenly capable of producing. The majority of crop consultants I have talked to with GPS experience generally agree that most yield variations have very little (if anything) to do with fertility.
Assuming that yield variability relates first to fertility can lead to frustration. Farmers with different soils can see tremendous yield drops, and yet fertility levels can remain the same. Under dry conditions, some varieties with small root systems won't take up fertility very efficiently. But fertility can jump up on the list of other concerns don't overshadow it.

My biggest problem is this, for most crops, majority of information currently being printed is based on grid soil sampling and fertility placement. Common sense dictates that much more can be accomplished by systematically analyzing geo-referenced yield data than an arbitrary grid sampling could possibly do.

I think someone should make it clear to prospective users of a GPS system that fertility refinement is an important but tiny piece of the true value of their investment. Until the cost of this equipment comes down, taking the "GPS plunge" strictly as a sampling and fertility placement tool, probably is not a wise investment.

Yield Monitors

A yield monitor is a great tool for collecting data and showing you what actually took place in a field. The interpretation of the data is what will lead you to change management practices.

The practice of "precision mapping" today, is not necessarily precision farming. "We can collect data form a point in time and space, but we have to relate it back to an overall outcome or management for that field. Tools like GPS can be very useful for finding spots in the field for

future reference or for record keeping. But we need to keep in mind the limitations of the tools and of our interpretation of the data.
Yield monitors can be like truth serum, and some crop consultants would prefer that farmers wouldn't pay much attention to them. They'd rather impress the farmer with precision mapping products. And some crop consultants seem to want to make recommendations and decisions for the farmer. Consultants can sell some farmers on this, but the bottom line is it's hard to make testimonials out of things that are not working.
Improving the management of the controllable factors affecting crop yields is the primary benefit of on-the-go yield monitoring. Accurately knowing the yield variability within a field can become the cornerstone of a crop management plan. But first, it's important to know if the yield variability within the field is stable from year to year. We should find out if some areas consistently yield higher from year to year while other areas consistently yield lower. Else we should find if the yield variability pattern change within the field each year? If the yield pattern is not consistent it's important to determine the cause of this yield instability.

Perhaps weather is the cause. It's wise to have several years of yield data before putting too much stock in the yield maps or before making costly management changes. If the purpose of monitoring yield variability is to compare varieties herbicide rates or types, starter fertilizer, or crop injury from a pesticide, one year of data may be helpful as a starting point, however data from several years will be much more helpful.

If the purpose of monitoring is to improve overall management of the field and perhaps modify some of the soil factors, then it seems wise to have 3 to 6 years of data as a starting point. This is the minimum needed to separate out climate-induced variability within a field.
It is also necessary to look at why yields are variable, considering controllable and uncontrollable factors. Controllable factors are soil fertility, pests, plant population, variety selection, drainage, and tillage.

The goal is to increase profit by improving management of controllable factors, or inputs. But there is an up-front cost for yield monitors, so each farmer must understand and use them wisely to make them pay. Yield monitors can be a cost-effective management tool or a costly gadgets.

On-the-go yield monitors generate a lot of hype and enthusiasm among farmers. Data from the monitors are often expressed in color-coded yield maps for whole fields or farms. But such maps aren't automatically beneficial to farmers. There's much more to collecting, understanding, and managing collected yield data than developing colorful maps.

For the data to be reliable, you need to know that the yield monitor is properly calibrated. Indications are that factors such as constant travel speed of the combine and slope of the field influence the accuracy of the data. In summary, purchase a trustworthy monitor, properly calibrate it before putting too much emphasis on a yield map.
The time spent accumulating yield maps can be devoted to setting goals and laying out a plan for taking advantage of what the technology can offer.

Finally, a yield monitor owner can learn from just watching it operate-without GPS or mapping

capabilities. Maps, though, provide more tangible data.

For those farmers who hire crop consultants, using a yield monitor may be a benefit. We as farmers will be able to precisely measure the value of their recommendations.

Ecology first?

According to Joseph Berry, a leading GIS consultant based in Ft. Collins, Colorado, states "If agriculture follows other industries, notably forestry, we'll be using site-specific technologies primarily for environmental litigation anyway-not economy or agronomy."

Why should a farmer get into precision farming?

There are dozens of reasons to seriously consider site-specific farming.
* To determine a way to manage varying soil types within a field
* To decide how to approach drainage problems and if it pays to fix them
* To use Site Specific Farming to better manage inputs
* To identify trouble spots linked to insects or disease
* To generate better farm-specific data for selecting varieties for soil types.
* To impress present landlords or lure new ones.
* To satisfy farm lenders who require yield maps.
* To reduce inputs, or at least apply inputs (chemicals and fertilizers) in a environmentally appropriate manner.

Who's in control?

When we are in our fields and apply any amount of pesticides or fertilizers we assume responsibility for the consequences. We have the liability for the economic and ecological consequences of our decision. The "prescription" will likely be developed by a combination of computer models and local agronomic expertise. Certainly it should also account for the intrinsic knowledge and wisdom of us, the farmer operator. Otherwise, how will we defend ourselves with an environmentalist who questions our farming practices? Their maps and models may use the same data as we do, but may look entirely different because of different assumptions. If the environmentalist doesn't like what was done in a field application, WE not the "intelligent implement" will bear the final liability.

Will we rely on a computer? Or on input decisions made by someone or something else? Remember, it's our data, our dollars, our decision, and our destiny.

Summary

In the long run, we will figure out how to make site-specific farming economical-because we will be using it to meet consumer demand for attribute-specific farm products. Information will be the new farm commodity. Information-rich farmland and farm products may be worth more, too.

Our data is our destiny, past points to the future, and how we collect the data will be our savior. It is important to note that just about every industry that services the agriculture production sector agrees that the farmer should "own the data." The problem is it's not who owns the data, but who controls it. "He who holds information wields power!"

Finally, the data we collect should include;
1. security-(what data gets into what hands)
2. exportability-(not locked into proprietary systems)
3. accessibility-(by the farmer, not just the experts)
4. interpretability-(data pools and common model sets)
5. applicability-(integration with other data and decision support models)
6. understandability-(where the numbers come from, how parameters are weighted)

Data Sources,
Entrapped or Empowered by Technology? Grant D. Mangold, Editor ag/INNOVATOR
Does precision pay its way? Charlene Finck, Farm Journal, 1/1996
Soil Specific Crop Management University of Minnesota conference 1992

GRAINS AND OILSEEDS OUTLOOK FOR 1997

by

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What a difference a year makes. When the 1996 Outlook Conference was held a year ago, grain prices were caught in an upward spiral that exceeded nearly everyone's expectations. The record highs reached in many grain markets during 1996 reflected strong demand and tight supplies. Farmers in the U.S. and worldwide responded to these high grain prices by increasing acreage and production. In recent months, grain prices have tumbled from these highs and there are indications they will continue to soften in the next year.

Most prices in the oilseed complex were also strong in 1996, although they did not soar to the record heights of the grains. However, in recent months, soybean and soybean meal prices have actually strengthened. While growing demand has been a driving force, robust oilseed prices also reflect the shift to grain plantings in 1996 in some areas of the world at the expense of oilseeds. Like the situation for grains a few months ago, U.S. and foreign producers are reacting to these price signals. This will bring an expansion of production in 1997 and some moderation in oilseed prices.

Rapid Change Marks the Agricultural Setting

New developments seem to be arising at a faster pace than ever, bringing change and challenges to the farm sector. In the last year or so, for example, we experienced hedge to arrive controversies, the discovery of karnal bunt in some wheat, the release of the genetically engineered Roundup ready soybeans and Bt corn, more railroad mergers, and the imposition of export taxes by the European Union. Meat and poultry exports continued to set new records despite sporadic disruptions in the important markets of Russia and China. Interspersed with this lineup were an assortment of weather events, such as the wet, cold spring that interfered with planting in the Corn Belt and a drought in the southern plains.

One of the most critical developments of 1996 was passage of the new Farm Bill that reduced the role of government and set the stage for more changes to come. With just a year to go on, the full impact of the new legislation remains in question.

Some analysts point to the wild ride in the markets of the last year as confirmation that price volatility will increase under the new farm bill, particularly with no mechanism to rebuild government stocks. On the other hand, others believe the discipline of the market will improve efficiency and help reduce volatility over time.

The new environment places more demands on management and marketing skills and places a premium on information--about both domestic and international markets--to make informed choices. Yet there are some contradictions. Sources of information seem to proliferate in the computer and Internet age, but some basic data seems to get more scarce. Budget constraints limit government surveys while mergers and acquisitions are increasing concentration at many points in the marketing and processing system. Many of these changes are reducing publicly available data. For many producers, the handling of risk has emerged as a critical concern.

Price Response, Flexibility, and China Are Key Factors

Before turning to the specific market outlook, I want to highlight three features, among many, helping to shape the 1997 outlook: price response, flexibility, and the role of China. Many policy issues and fundamentals were discussed more fully in this morning's session on the long run baseline projections.

The response to last year's high prices has been quite dramatic. especially for wheat, and the impact will carry over into 1997. Spring wheat plantings excluding durum in the U.S. jumped to the highest level since 1936 while corn acres were the highest since 1985 despite some adverse conditions at planting time. Competitor wheat plantings also surged, with acreage in Australia and Argentina the highest in about a decade. Led by Brazil, soybean plantings rose to record highs in South America.

Generally favorable weather has resulted in or is expected to yield bumper crops in most areas. The production increase has brought down grain prices and replenished exportable supplies. The current high oilseed prices are expected to decline later in the year as South American crops reach the market and producers in other countries such as Canada and India respond by increasing 1997 production. Although government controls remain in place in many areas, market signals are clearly working.

There has been evidence of greater U.S. planting flexibility in the last year with the elimination of base acreage requirements under the 1996 farm Bill. Although some of the response in 1996 was a reflection of weather-related problems, the new environment facilitated switching to other crops and fuller use of rotations. There are numerous examples, including more wheat land planted to feed grains, cotton moving into feed grains, rice switching to corn, and even some sugar beet acres planted with corn. This portends more flexing if conditions merit.

China has played a prominent role in the markets for all the field crops in recent years, whether due to its presence or absence. China's recent buying spree has been a central element in the record U.S. soybean crush and strong soybean and soybean meal exports. For the wheat market,

China's lack of import buying in this marketing year has helped to depress world demand and keep a lid on prices. Two years ago, China helped to propel the corn market as it switched from a major net exporter to a net corn importer. In recent months, China has played a more neutral role with a lower trade profile, but we expect it will once again be a small net exporter of corn in 1996/97.

Obviously there is a great deal of uncertainty about China's role in the next year. While its farm sector has displayed an increasing market orientation, the presence of the central government is still large. It is interesting to note that China has not sustained very large imports in any commodity market for very long in recent years, possibly because of its interest in increasing self-sufficiency.

1997/98 Crop Outlook

These forecasts were updated in early February and may be slightly different from some of the 1997/98 numbers contained in the long-run baseline projections. In most cases, changes reflect adjustments made in the 1996/97 outlook made between November and February that were published in the WASDE report.

Most of the initial U.S. agricultural attache forecasts of foreign countries' supply and use will only become available in the next few weeks. These reports, along with the March *Prospective Plantings* and *Grain Stocks* reports, could alter our projections substantially. USDA will publish its first forecasts of the supply and demand balance sheets in the May WASDE.

Wheat

U.S. 1997/98 wheat production is expected to be little changed from this year, but supplies will be up because of larger carryin stocks. Total use is expected to be near this year's level, as larger exports and food use offset lower feed and residual use. Stocks are expected to rise and prices will be weaker.

Winter wheat plantings are estimated at 48.2 million acres, down 7 percent from 1996 and the lowest since 1978. In contrast to the fall of 1995, when prices were rising, cash prices were falling during the 1996 planting season and futures prices also pointed to lower prices by harvest. Late harvests of other crops, such as sorghum in Kansas and soybeans in the eastern Corn Belt, also contributed to lower plantings. Wet weather was a problem in many soft red winter wheat areas such as Arkansas and Illinois while dry weather was a factor in Montana.

In spite of the large drop in plantings, harvested acres of winter wheat are expected to be little changed from 1996/97 when drought and winterkill caused an unusually small percentage of planted acres to be harvested for grain.

Table 1. Wheat: Supply, Demand, and Price

	1995/96	1996/97 1/	1997/98 2/
Area planted (mil. acres)	69.1	75.6	70
Area harvested	60.9	62.9	60.6
Yield (bu./acre)	35.8	36.3	37.5
Production (mil. bushels)	2,183	2,282	2,270
Beginning Stocks	507	376	474
Imports	68	80	85
Supply	2,757	2,738	2,829
Feed and residual	152	300	250
Food, seed, & industrial	988	1,014	1,025
Total Domestic Use	1,140	1,314	1,275
Exports	1,241	950	1,000
Total Use	2,381	2,264	2,275
Ending Stocks	376	474	554
Farm Price ($/bushel) 3/	$4.55	$4.30	$3.45

1/ Forecast. 2/ Projected. 3/ Mid-point of average forecast.

Spring wheat plantings will also be down from last year. In 1996, spring wheat acreage soared 16 percent to the highest in 50 years as prices were nearing record levels at planting time. In addition to the drop in prices, some land brought out of fallow in 1996 is expected to return to fallow this year.

Harvested acres of all wheat are forecast at 60.6 million, down 4 percent from 1996. A 5-year average yield by States indicates an overall yield of 37.5 bushels per acre. This results in production forecast down only 12 million bushels from 1996 but the lowest since 1991.

Because of larger carryin stocks, wheat supplies in 1997/98 are forecast to be up 3 percent to 2,829 million bushels, or nearly 100 million higher than this year. Carryin stocks are forecast at 474 million bushels, compared with 376 in 1996/97. Despite this prospective gain, both wheat stocks and supplies are relatively low by historical measures. However, over the last few years, stocks levels in the neighborhood of 500 million bushels are becoming the norm, not the exception.

Sharp competition and modest growth in import demand for wheat will keep U.S. exports weak in 1997/98. Exports are forecast at 1 billion bushels, up 50 million from 1996/97. U.S. exports were heavily front loaded in 1996/97 as U.S. supplies became available before those of the competitors.

The wheat exporters, Argentina, Australia, and the EU, had record wheat crops in 1996/97, and Canada's crop was also up sharply. Exportable supplies are projected to remain large for 1997/98 even with some decline in production. World import demand is forecast to rise but remain relatively weak in 1997/98. How much global imports rise largely depends on weather conditions in coming months in North Africa and India, and how much China's wheat imports rebound from this year's extremely low levels.

U.S. food use of wheat should be relatively stable, but total domestic use is expected to drop slightly because of lower feed and residual use. While wheat prices will be lower in the first quarter than last year, even larger declines in corn prices will make wheat feeding less attractive, barring quality problems.

The season average price for wheat is projected at $3.45 per bushel, down from $4.30 forecast for 1996/97. This reflects the prospective increase in supplies and a 17 percent increase in ending stocks. In addition, lower world prices are expected to pressure U.S. prices down.

Corn

Corn production and supplies are expected to increase again in 1997/98. Even with larger domestic disappearance and higher exports, stocks are projected to rise and prices will be moderately lower.

Corn plantings are forecast at 81 million acres, up about 1.5 million from 1996. As prices have retreated from their record highs, there is less incentive to plant corn in areas outside the main Corn Belt that saw sharp increases in 1996. However, plantings will remain large in the major growing areas even in the face of strong competition with soybeans, whose area is also forecast to rise.

Current market prices and nearby futures indicate a soybeans to corn ratio that is well over 2.7 to 1, favoring soybeans. The ratio based on futures prices for contracts later this year after harvest is lower and more neutral. Because of wet conditions, particularly in Indiana and Ohio, some land intended for corn in 1996 went into soybeans. This area, commonly estimated at 1-1.5 million acres, is expected to be planted to corn in 1997. In addition, a large amount of soft red wheat land will potentially be available for corn or soybeans.

U.S. corn yields in 1997 are projected at 128 bushels per acre based on the long-term trend from 1960. The 1996 yield of 127.1 bushels was the first average yield in the 120's, and the first time

since 1990 that the actual yield was about the same as trend. Variability in corn yields has been pronounced in the 1990's, reflecting the impact of weather. (Although the trend implicitly incorporates a normal distribution of weather, it is probably wise to consider the implications of severe weather pulling yields down sharply or a spectacular season that elevates yields a la 1994.)

Table 2. Corn: Supply, Demand, and Price

	1995/96	1996/97 1/	1997/98 2/
Area planted (mil. acres)	71.2	79.5	81
Area harvested	65	73.1	74.7
Yield (bu./acre)	113.5	127.1	128
Production (mil. bushels)	7,374	9,293	9,560
Beginning Stocks	1,558	426	959
Imports	16	10	10
Supply	8,948	9,729	10,529
Feed and residual	4,711	5,200	5,400
Food, seed, & industrial	1,583	1,670	1,755
Total Domestic Use	6,294	6,870	7,155
Exports	2,228	1,900	2,125
Total Use	8,522	8,770	9,280
Ending Stocks	426	959	1,249
Farm Price ($/bushel) 3/	$3.24	$2.70	$2.50

1/ Forecast. 2/ Projected. 3/ Mid-point of average forecast.

Production of corn is projected to rise 3 percent to 9,560 million bushels in 1997. Corn supplies are projected to increase even more, up 8 percent from 1996/97 to more than 10.5 million bushels, because of larger carryin stocks.

Because of time limitations, I will make only a brief reference to the other feed grains. Aggregate supplies of sorghum, barley, and oats are expected to show little change in 1997/98, rising about 1 percent. Sorghum production and supply is projected to fall because of lower acreage after the sharp gains of 1996. Sorghum planted acres are forecast to stay relatively high at 11.8 million acres. Small increases in barley and oats plantings are projected in 1997. Supplies of barley and oats are expected to rise because of larger carryin stocks and small increases in production.

Total use of corn is projected to increase about 6 percent in 1997/98 because of both stronger exports and growth in domestic use. Feed and residual use of corn is forecast at 5,400 million bushel, up 200 million from 1996/97. Larger corn supplies, lower prices, and some slippage in feeding of other grains should help bolster use in 1997/98. Growth in feed demand will be largely driven by increases in the hog and broiler sectors, with both benefitting from robust exports.

Food, seed, and industrial (FSI) use in 1997/98 is projected to expand 5 percent to 1,755 million bushels. Growth is expected to be led by further gains in sweetener production and continued recovery in corn used for ethanol. Total FSI use should exceed the previous high of 1,690 million bushels of 1994/95 as it resumes its steady course of expansion, which was interrupted in 1995/96. In the face of tight corn supplies and record prices, FSI use dropped 6 percent in that year, virtually all due to lower ethanol production.

U.S. corn exports are projected at 2,125 million bushels, up 225 million from 1996/97. This reflects small gains in the U.S, market share, along with some growth in world imports. Competitor corn exports are likely to slip in the face of lower prices, boosting U.S. prospects. Import increases are primarily fueled by gains in developing countries tied to rising meat and poultry production.

Ending stocks of corn are expected to rise nearly 300 million bushels to 1,249 million as the increase in supply outstrips disappearance gains. More abundant supplies and lower prices for most other crops will exert some downward pressure on prices. The season average farm price of corn is projected at $2.50 per bushel in 1997/98, down 20 cents from the forecast price for 1996/97.

Soybeans, Soybean Meal, and Soybean Oil

No dramatic changes are in store for the soybean complex in 1997/98. Moderate gains in production and supply are expected, but a continuation of robust demand will prevent any sizable accumulation of stocks. The outlook calls for some moderation in prices.

Soybean acreage is projected to rise for the fifth straight year in 1997 as strong prices this spring and use for rotations in some regions support increased plantings. Planted acres are projected at 65.3 million, up about 1 million from 1996 and the highest since the mid-1980's. Some land unplanted to soft red winter wheat in the mid-south and Midwest is likely to go to soybeans. As mentioned previously, strong competition with corn for land will continue to be a feature in the Midwest. A drier spring than the last 2 years will allow some corn planting on land that had to be switched to soybeans when it got too late for corn.

Overall, soybean area should be up in the western Corn Belt but down in the eastern Corn Belt. Increases are also expected in most other regions including the southeast and Delta where soybeans will compete well with cotton and grain crops.

Soybean production is forecast at 2,475 million bushels, up 4 percent from 1996. Yields are projected at 38.5 bushels per acre, consistent with recent trend growth that reflects higher plant populations and other cultural practices along with improvement in varieties. Once again in 1996, soybeans displayed resilience, achieving high yields in the face of less than perfect growing conditions.

Table 3. Soybeans: Supply, Demand, and Price

	1995/96	1996/97 1/	1997/98 2/
Area planted (mil. acres)	62.6	64.2	65.3
Area harvested	61.6	63.4	64.3
Yield (bu./acre)	35.3	37.6	38.5
Production (mil. bushels)	2,177	2,382	2,475
Beginning Stocks	335	183	140
Imports	4	4	5
Supply	2,516	2,570	2,620
Crush	1,370	1,410	1,425
Seed and residual	111	116	119
Total Domestic Use	1,481	1,526	1,544
Exports	851	905	855
Total Use	2,333	2,431	2,399
Ending Stocks	183	140	220
Farm Price ($/bushel) 3/	$6.77	$7.00	$6.60

1/ Forecast. 2/ Projected. 3/ Mid-point of average forecast.

Table 4. Soybean Oil and Meal: Supply, Demand, and Price

	1995/96	1996/97 1/	1997/98 2/
OIL			
Beginning Stocks (mil. lbs.)	1,137	2,015	1,965
Production	15,236	15,350	15,890
Imports	95	100	95
Supply	16,468	17,465	17,950
Domestic Use	13,460	13,650	13,850
Exports	992	1,850	1,950
Total Use	14,452	15,500	15,800
Ending Stocks	2,015	1,965	2,150
Avg. oil price (cents/lb) 3/	24.75	0.235	0.23
MEAL			
Beginning Stocks (1000 s.tons)	223	229	200
Production	32,513	33,341	33,895
Imports	75	80	80
Supply	32,812	33,650	34,175
Domestic Use	26,581	26,800	27,650
Exports	6,002	6,650	6,300
Total Use	32,583	33,450	33,950
Ending Stocks	229	200	225
Avg. meal price ($/ton) 3/	$236.00	$237.50	$220.00

1/ Forecast. 2/ Projected. 3/ Mid-point of average forecast.

Because carryin stocks will be so low--forecast at just 140 million bushels--in 1997/98, the gains in supply will be quite modest. Supply is projected up 2 percent to 2,620 million bushels.

Demand prospects are relatively bullish, but will be heavily influenced by international developments in the remaining months of 1996/97 as well as the year ahead. One major question is how fast the supplies from South America's record harvests begin to enter export channels, cutting into the current torrid pace of U.S. exports of soybeans and soymeal. If the pace of South America sales and shipments is slow in the weeks ahead, this would support near-term U.S. exports but reduce prospects early in 1997/98.

Global import demand for soybeans is expected to moderate slightly in 1997/98, mainly because the EU and China are projected to import less. Even with some increases in the supply of competing protein meals, world imports of soybean meal are projected to show another small increase. This would be the fifth consecutive record. The most dynamic growth has been in Southeast Asia and China, although China's imports are expected to slip in 1997/98. China's soymeal imports went from virtually nothing in 1994/95 to 2.1 million tons forecast for 1996/97. Despite the likelihood of larger oilseed crops in China in 1997/98, import demand should remain on a strong track.

The season average farm price of U.S. soybeans is forecast at $6.60 per bushel in 1997/98, down about 40 cents. Ending stocks are projected to rise 80 million bushels to 220 million, but to stay low enough to provide some underlying support for prices. Soybean meal prices are expected to fall about 6 percent to $220 per ton. Prices for soybean oil, which have not been as buoyant in recent months, are projected to hold near 1996/97 levels of 23.5 cents per pound.

Conclusion: More Change Ahead

It is safe to say many of the numbers presented today will change in the months ahead. The agricultural outlook can swing quickly and surprise us in many ways. I will leave you with some words from Will Rogers from 1934:

> "These old boys with a pair of specs and a tablet can sit and figure out how much wheat, corn, and oats can be raised each year in order to sell each bushel of it at a profit. Then along comes a guy called "elements." This bird "elements" never went to college and he has never been called an expert. But when this guy "elements" breaks out, he can make a sucker of more experts than anybody."

AN ALTERNATIVE PERSPECTIVE ON THE GRAIN AND OILSEED OUTLOOK

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The outlooks for corn and wheat are both characterized by increasing stocks for 1996/97 and 1997/98. Record world grain production in 1996/97 will allow stocks to rebuild to more comfortable levels following extremely tight domestic and foreign supplies in 1995/96. In contrast, the oilseed outlook involves tightening soybean supplies for 1996/97 and 1997/98. This is partially the result of record grain prices during 1995/96, which shifted world production from oilseeds to grains.

SCI sees US corn and wheat ending stocks increasing to a greater extent than USDA. SCI projects larger crops for 1997 and weaker demand for 1996/97 and 1997/98 than USDA. The discrepancy in demand forecasts is partially due to a difference in research methodology. USDA forecasts demand at equilibrium prices whereas SCI demand forecasts are based on current market prices. SCI considers the price outlook bearish for wheat and corn, especially for new-crop if trend-type yields are achieved in 1997. If this price outlook is realized, actual disappearance should be somewhat higher than SCI's current forecasts and prospective carryouts somewhat lower.

SCI's 1996/97 soybean outlook is not much different from USDA's as projected ending stocks are both around 140 million bushels. SCI, however, does not consider such a carryout a realistic outcome and therefore expects that higher prices will be needed to ration at least 30 million bushels of demand. The outlooks for 1997/98 diverge as USDA expects stocks to build while SCI anticipates demand to exceed production in 1997/98 given the current production and price environments.

Corn Outlook

A huge demand base was built for US corn during the fall of 1994. Amid a record corn crop of 10.1 billion bushels in 1994/95, domestic demand reached record levels thanks to robust feeding and expansion in the ethanol industry. More dramatic were developments on the world market. China shifted from being the largest corn export competitor to a net importer and the fourth largest destination for US corn. Tightening world wheat supplies priced wheat out of South Korean feed rations. The combined impact of these two developments was an additional 650 million bushels of US corn exports. Also contributing to stronger US exports was a sub-par 1994 EU-15 grain crop, a drought-stricken South African corn crop in early 1995, and implementation of NAFTA.

Record US 1994/95 disappearance continued at a near record pace through the first half of 1995/96. The 1995 corn crop was plagued by various weather extremes and the unnecessary imposition of a 7.5 percent Acreage Reduction Program. The EU-15 had another sub-par grain crop, which limited its grain exports and increased its imports of US corn and sorghum. By the time the market realized the severity of the corn situation, the 1995/96 carryout was destined to drop to a bare minimum with prices and spreads headed to record levels to curtail demand and bring supplies forward.

The 1996/97 corn outlook is markedly different from 1995/96. Despite problems with the Eastern Corn Belt, 1996 US corn production was 1.9 billion bushels larger than the previous year due to excellent crops in much of the Western Corn Belt.

Corn exports are expected to drop below 2 billion bushels in 1996/97 after exceeding that mark the two previous years. China has reemerged as a net exporter of corn after harvesting two consecutively good grain crops. In addition, improved production will reduce Mexican and EU-15 corn imports to minimum levels prescribed in bilateral trade agreements. Also, export competition will be strong the last half of 1996/97 as Argentina executes a near record corn export program given prospects for a record large crop.

SCI expects US 1996/97 corn ending stocks to rebuild above 1 billion bushels. USDA projects that the carryout will be 959 million bushels as it forecasts all three usage categories at somewhat higher levels than SCI. In either case, the carryouts should allow prices to trend lower in the coming months, particularly if the 1997 crop develops without any serious problems.

Both SCI and USDA forecast further stock-building in 1997/98 with USDA anticipating a more modest increase due to smaller supplies and larger demand. Given this outlook, SCI expects new-crop futures to drop below $2.50 by this fall.

Based on SCI's January survey, 1997 corn planted acreage is indicated to increase to 81.5 million, up 2 million from the previous year and 500,000 acres above USDA's projection. Although corn/soybean price relationships may not suggest an increase in corn acreage, there were perhaps 1.5 million acres that did not get planted last year because of wet planting conditions. Those acres are expected to return to corn production for rotational reasons. Strength in the soybean market in the coming months, however, could partially offset this gain and shift some acreage away from corn.

Domestic usage and exports are expected to expand in 1997/98 amid larger supplies, lower prices and increased import demand. Like 1996/97, USDA forecasts larger consumption than SCI in all usage categories for 1997/98, but the most significant difference is exports. Much of the discrepancy is due to assumptions about China. SCI expects that China will continue to be a net exporter of 1 million tons of corn in 1997/98 while USDA projects China to be a net importer of about the same magnitude. Some of the corn that SCI expects China to export in 1997/98 will probably be 1996 production shipped at the end of the 1997 calendar year. Toward the end of 1997/98, China will probably have to resume corn imports unless it has an exceptional corn crop.

CORN SUPPLY AND DEMAND (Million Bushels/Million Acres)

	1994/95	1995/96	1996/97 USDA	1996/97 SCI	1997/98 USDA	1997/98 SCI
Planted Acres	79.2	71.2	79.5	79.5	81.0	81.5
Harvested Acres	72.9	65.0	73.1	73.1	74.7	75.2
Yield	138.6	113.5	127.1	127.1	128.0	127.6
Carryin (Sep. 1)	850	1,558	426	426	959	1,079
Production	10,103	7,374	9,293	9,293	9,560	9,600
Imports	10	16	10	10	10	10
Total Supply	10,962	8,948	9,729	9,729	10,529	10,689
Feed & Residual	5,537	4,711	5,200	5,150	5,400	5,350
Food/Seed/Ind	1,690	1,583	1,670	1,650	1,755	1,750
Domestic Use	7,227	6,294	6,870	6,800	7,155	7,100
Exports	2,177	2,228	1,900	1,850	2,125	2,000
Total Use	9,405	8,522	8,770	8,650	9,280	9,100
Carryout (9/31)	1,558	426	959	1,079	1,249	1,589
Stocks/Use	16.6%	5.0%	10.9%	12.5%	13.5%	17.5%
Farm Price($/Bu)	2.26	3.24	2.70	2.65	2.50	2.30

Wheat Outlook

Lower wheat supplies in the US and throughout much of the world in 1995/96 reduced stocks-to-use ratios to record low levels. Relatively tight US supplies were exacerbated by the lowest competitor wheat exports in 15 years. Consequently, US ending stocks were reduced to a bare minimum, which propelled prices to record high levels.

The situation changed considerably in 1996/97 as world wheat production recovered to near record levels. Competitor exports rebounded to record levels, which reduced US wheat export prospects below 1 billion bushels for the first time since 1985/86. Although US wheat exports were fairly robust during the first half of 1996/97, they have been severely hampered by strong competition.

US ending stocks for 1996/97 are expected to increase to 486 million bushels, just above USDA's 474-million-bushel forecast. SCI does not expect imports to be as large as USDA, but SCI projects a more modest increase in domestic usage. SCI's 1996/97 wheat export projection is somewhat larger than USDA's.

This season's turnaround to both larger global output and stocks is expected to continue into 1997/98. New-crop world wheat production is expected to be up 8 million tons from 1996/97. Although global consumption is expected to rise sharply in 1997/98, world ending stocks are expected to jump to the largest amount relative to use since 1993/94. As a consequence, the stage is set for US stocks to rise significantly in 1997/98, which should apply further pressure to prices.

US wheat production for 1997 is expected to increase to more than 2.4 billion bushels on higher harvested acreage and improved yields. Although planted acreage is expected to be down, harvested area likely will increase as an unusual amount of winter wheat was abandoned in 1996. Based on SCI's January survey, wheat planted acreage is projected at 71.7 million. Since USDA

and SCI acreage projections both incorporate USDA's January Winter Wheat Seedings estimate, SCI is higher on total acreage because of larger spring wheat plantings. SCI's survey indicates that spring wheat acres in the Dakotas and Minnesota hold their own compared with last year, while Montana gains spring wheat acreage from winter wheat land that did not get planted and from a shift out of barley.

US wheat exports in 1997/98 will be under continued pressure due to even stronger competition. With growth in food usage limited, the task of the market is to encourage a larger wheat feeding program than current price relationships would support. Thus, it appears that prices are destined to slide significantly into early 1997/98 with July wheat futures expected to drop toward $3.00. Little seasonal bounce is anticipated given prospects for a sizable jump in ending stocks.

WHEAT SUPPLY AND DEMAND (Million Bushels/Million Acres)

			1996/97		1997/98	
	1994/95	1995/96	USDA	SCI	USDA	SCI
Planted Acres	70.3	69.1	75.6	75.6	70.0	71.7
Harvested Acres	61.8	60.9	62.9	62.9	60.6	63.6
Yield	37.6	35.8	36.3	36.3	37.5	38.4
Carryin (Jun. 1)	568	507	376	376	474	486
Production	2,321	2,183	2,282	2,282	2,270	2,442
Imports	92	68	80	65	85	40
Total Supply	2,981	2,757	2,738	2,723	2,829	2,968
Food/Seed	942	988	1,014	950	1,025	972
Feed & Residual	344	152	300	300	250	225
Domestic Use	1,287	1,140	1,314	1,250	1,275	1,197
Exports	1,188	1,241	950	986	1,000	963
Total Use	2,475	2,381	2,264	2,237	2,275	2,160
Carryout (May 31)	507	376	474	486	554	808
Stocks/Use	20.5%	15.8%	20.9%	21.7%	24.3%	37.4%
Farm Price($/Bu)	3.45	4.55	4.30	4.35	3.45	3.25

Soybean Outlook

The soybean outlook for 1996/97 is shaping up be much like the 1995/96 corn and wheat situations. To a certain extent, the tight soybean situation is the result of last year's record high grain prices that diverted resources from oilseeds to grain production. US 1996/97 usage is projected to be record large due to an increase in world import demand and a reduction in foreign supplies.

China emerged as a net importer of soybeans and soybean meal in 1995/96 as ongoing consumption growth outstripped its ability to produce. During the first half of the 1996/97 crop year, China has been a heavy buyer of oilseeds. At the same time, Brazil supplies on September 1, 1996, were 3 million tons less than the previous year because of a short 1996 crop. A moderating factor on world import demand is a slowdown in the EU-15 as relatively high oilseed prices have encouraged more grain feeding at the expense of oilseeds.

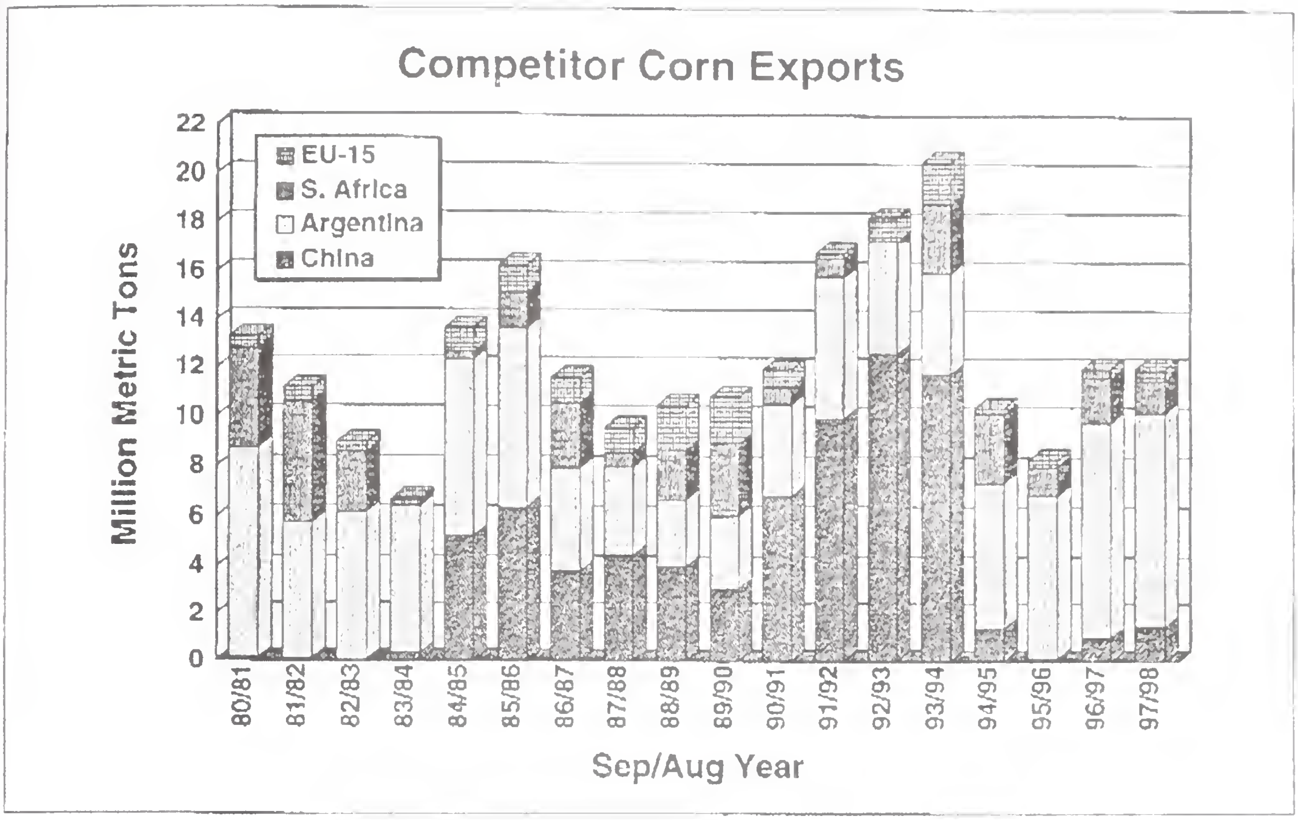
The rate of US soybean disappearance established during the first half of 1996/97 cannot continue through the second half of the marketing year. Ongoing usage must slow from a pace of 52 million bushels per week during Sep/Feb to a 35-million-bushel pace the last half of 1996/97. At this juncture, both USDA and SCI see the 1996/97 carryout headed to about 140 million bushels. However, in reality, it will be difficult to reduce ending stocks below 1995/96's 183 million bushels. Some demand rationing will be necessary to sufficiently reduce US usage -- even with a large South American crop and expectations for a rapid marketing pace. This sets the stage for soybean futures to surpass $8.00 in the coming months.

Unless US soybean acreage proves to be larger than SCI survey indications suggest, US stocks will be drawn down further in 1997/98. SCI expects US usage to increase in 1997/98. Ongoing growth in oilseed consumption is anticipated to more than offset an increase in 1997 South American production as over half of the increase will be marketed by August 31, 1997. USDA forecasts a decline in usage for 1997/98 due to lower exports. Much of difference can be attributed to larger 1998 South American soybean crops forecast by USDA.

SCI survey indications peg 1997 US soybean planted acres at 64.5 million, up only 300,000 acres from 1996 and 750,000 acres below USDA's forecast for 1997. Even though soybean/corn price relationships are more favorable for soybeans this year, only a modest increase is indicated by SCI's survey. Eastern Corn Belt soybean acreage will be down in 1997 because of wet weather that diverted land from corn to soybeans in 1996. Currently, the soybean/corn ratios are at the threshold where soybeans may start to take acreage from corn if the ratio moves higher.

SOYBEAN SUPPLY AND DEMAND (Million Bushels/Million Acres)

			1996/97		1997/98	
	1994/95	1995/96	USDA	SCI	USDA	SCI
Planted Acres	61.7	62.6	64.2	64.2	65.3	64.5
Harvested Acres	60.9	61.6	63.4	63.4	64.3	63.6
Yield	41.4	35.3	37.6	37.6	38.5	38.5
Carryin (Sep. 1)	209	335	183	183	140	143
Production	2,517	2,177	2,382	2,382	2,475	2,450
Imports	5	4	4	---	5	---
Total Supply	2,731	2,516	2,570	2,565	2,620	2,593
Crush	1,405	1,370	1,410	1,416	1,425	1,418
Exports	838	851	905	888	855	936
Seed & Residual	153	111	116	117	119	117
Total Use	2,396	2,333	2,430	2,422	2,399	2,471
Carryout (Aug. 31)	335	183	140	143	220	122
Stocks/Use	14.0%	7.9%	5.8%	5.9%	9.2%	5.0%
Farm Price($/Bu)	5.48	6.72	7.00	7.15	6.60	7.00


Competitor Corn Exports
EU-15
S. Africa
Argentina
China
Million Metric Tons
0
2
4
6
8
10
12
14
16
18
20
22
80/81
81/82
82/83
83/84
84/85
85/86
86/87
87/88
88/89
89/90
90/91
91/92
92/93
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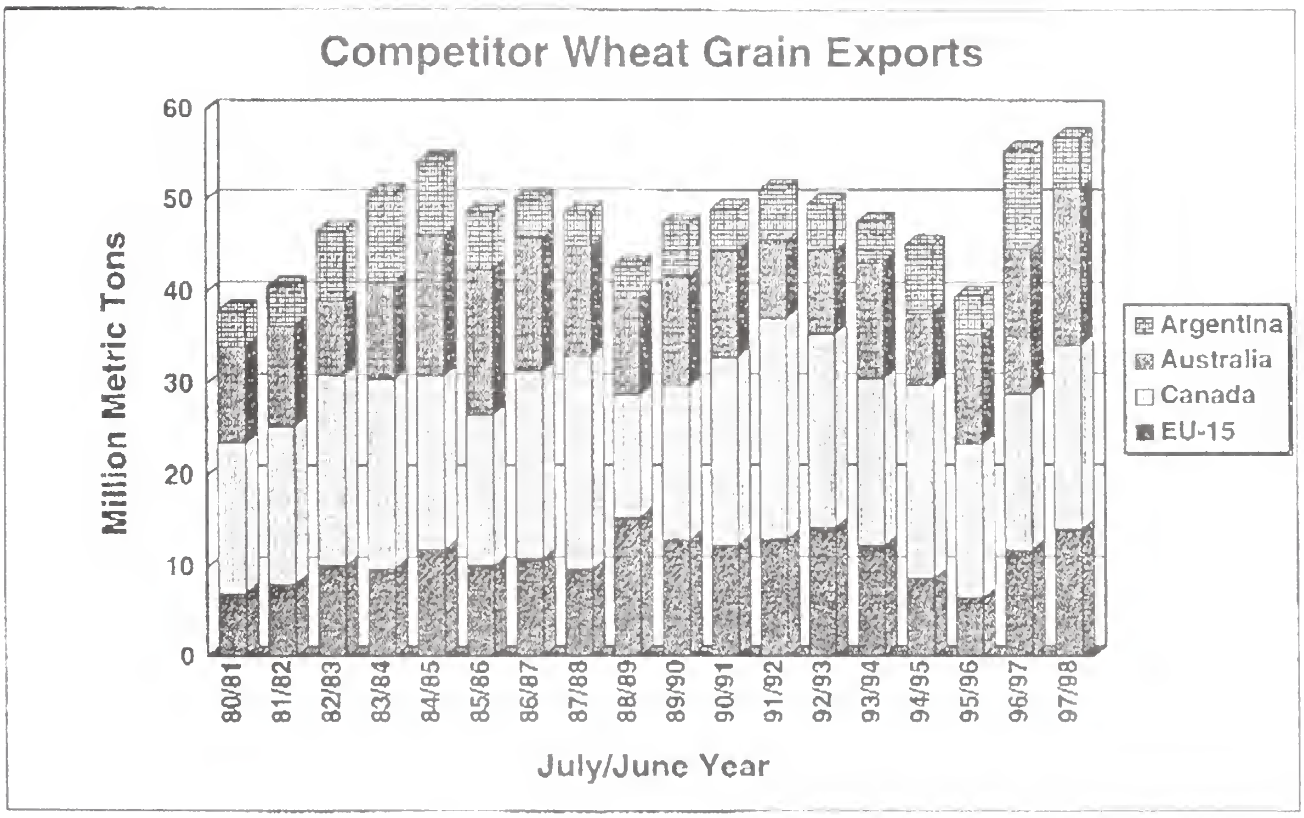
95/96
96/97
97/98
Sep/Aug Year


Competitor Wheat Grain Exports
Million Metric Tons
0
10
20
30
40
50
60
Argentina
Australia
Canada
EU-15
80/81
81/82
82/83
83/84
84/85
85/86
86/87
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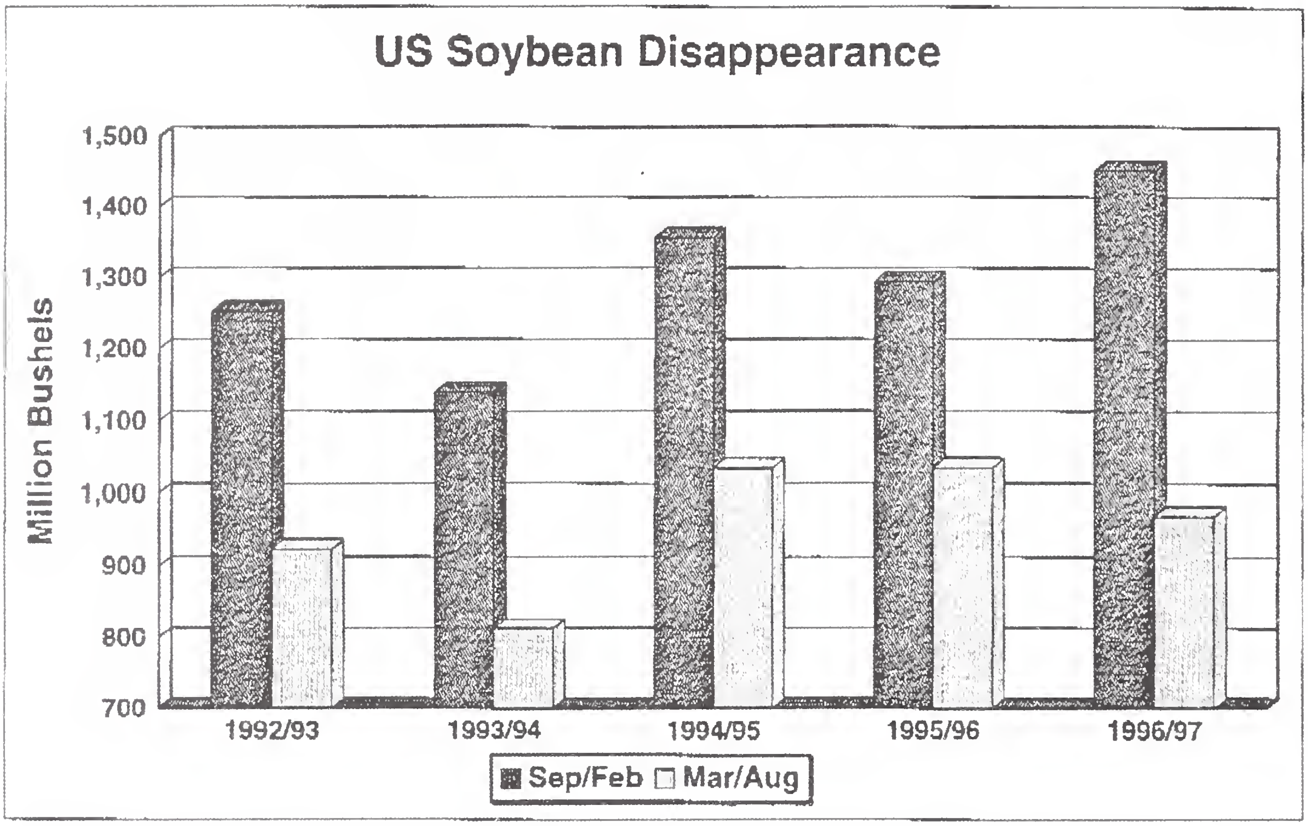
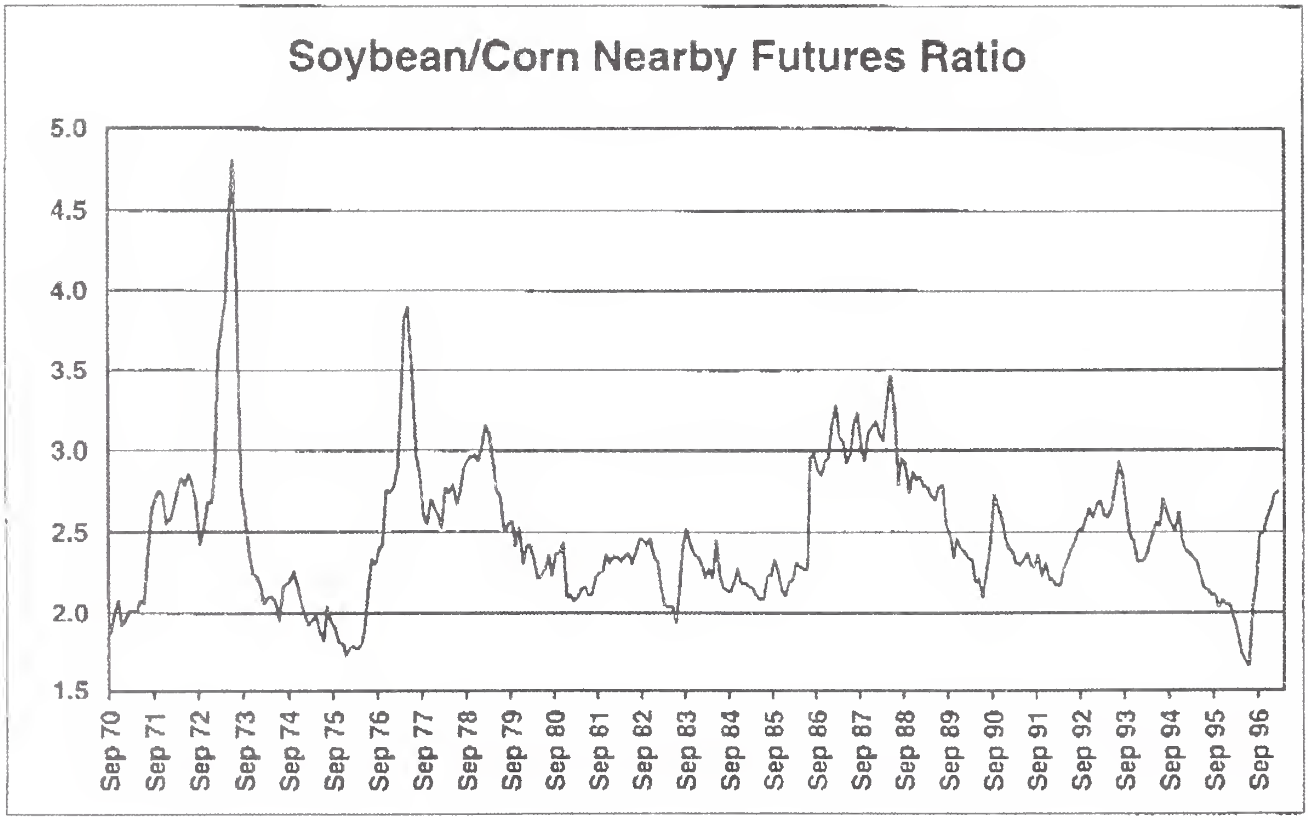
96/97
97/98
July/June Year



US Soybean Disappearance
Million Bushels
1,500
1,400
1,300
1,200
1,100
1,000
900
800
700
1992/93
1993/94
1994/95
1995/96
1996/97
Sep/Feb
Mar/Aug



Soybean/Corn Nearby Futures Ratio
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
Sep 70
Sep 71
Sep 72
Sep 73
Sep 74
Sep 75
Sep 76
Sep 77
Sep 78
Sep 79
Sep 80
Sep 81
Sep 82
Sep 83
Sep 84
Sep 85
Sep 86
Sep 87
Sep 88
Sep 89
Sep 90
Sep 91
Sep 92
Sep 93
Sep 94
Sep 95
Sep 96

A PRODUCER'S PERSPECTIVE ON CHANGING FARM PROGRAMS

Alan Karkosh
K&O Farms, Inc.
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Farm operations are going through a consolidation and are quickly evolving into large size businesses. The future will see a more sophisticated, business approach to management of farms. The question is, are we ready to accept farming as a business and not as a lifestyle? If so, let's quit changing the rules and let the marketplace work! Some significant changes are occurring in the farming world. The current farm program rules will provide higher, more stable yields. Crop acreage decisions will be based upon the best crop management and business decisions instead of on just price or program requirements. The market will have to provide substantial incentives for farmers to switch acres between corn and soybeans. Livestock operations are getting bigger, causing a steadily increasing feed demand which is more sensitive to quality than price. New technology like precision farming and Bt corn will increase yields and provide more yield stability. Farm size will continue to increase and farm numbers will decrease due to economies of scale.

Will government and farmers allow these changes to naturally occur without unwarranted intervention? How fast will the market learn to react to the new changes?

CROP ACREAGE DECISIONS:

The 1996 Farm Bill will provide a great benefit and reward to those farm operations with good management. For those operations lacking management and planning skills, it is going to provide new and difficult challenges. Under the old farm program, the decision on what crops were planted was simple. To maximize government payments, you planted all of your allowable base acres of each program crop. In Iowa, this meant you planted the maximum corn acres. In many cases, farms had near 100% corn base, so a lot of corn was planted. Once the program and set-aside requirements were established for the year, the crop plan was set for that cropping year. Under the old program, the price of the program crop was essentially established, therefore, a marketing plan was not really needed. Marketing your crop will now become more challenging and more important.

The rules have changed and more careful examination needs to be done of what crops we grow. Unfortunately for farmers in Iowa, we basically can plant either corn or soybeans. The flexibility of the current program is moving us to a 50/50 rotation of corn and soybeans. The move closer to a 50/50 rotation is already taking place in the Midwest. That's evident as we look at the increase in soybean acres in these states over the last few years, while corn acreage has been fairly steady.

One factor driving farms to a 50/50 rotation is that farms are increasing in size. With larger farms, an even crop split allows operations to be more efficient by spreading out the work load. The key planting time for corn is from about April 20 to May 10, while soybeans can be planted up until the end of May and still maintain good yield potential. Also, corn following soybeans can be produced at a lower per unit cost than corn-on-corn. The savings come from the need for less nitrogen, less insecticide, and higher yields.

Corn-on corn will produce on average 10 to 15% lower yields with the potential for greater yield reductions under stress conditions. Soybeans are no longer being considered a secondary crop like they once were under the old program. What we have found is that soybeans are a good risk management crop. Soybeans will generally handle more adverse conditions with less yield loss than corn under the same conditions.

YIELD STABILITY:

A balanced crop rotation or any rotation that gets away from growing one crop continuously will provide the opportunity for higher yields that are more consistent from year to year. A mono crop environment introduces more insect and disease problems that reduce yields. Rotating crops breaks up the insect and disease cycles. Crops like corn and cotton are going to benefit tremendously by bringing another crop into the rotation. The environment will also be a big beneficiary of a crop rotation. The rotation provides an alternative strategy to using plant protection chemicals to battle insects, disease, and weeds. In corn, nitrogen requirements are also reduced when rotated with another crop. Weather stress has less of an impact upon a rotated crop than a mono-culture crop.

PRICES NEEDED TO ATTRACT ACRES:
1997 Estimated Crop Costs for IA - ISU, Duffy and Vontlage (*AK)

	Corn after Soybeans 150 bu/A	Corn after Corn 135 bu/A	Soybeans after Corn 50 bu/A	Soybeans after Soybeans* 45 bu/A
Preharvest Machinery	$18.86	$22.79	$19.19	$14.58
Seed, Chemicals, Fertilizer, etc.	$136.69	$154.67	$89.65	$89.65
Harvest Machinery	$50.37	$47.01	$20.94	$20.59
Labor	$21.00	$23.80	$18.20	$16.10
Land	$145.00	$145.00	$145.00	$145.00
Total Cost per Acre	$371.92	$393.27	$292.98	$285.92
Total Cost per Bushel	$2.48	$2.91	$5.86	$6.35
Cost + 10% Profit	$2.73	$3.20	$6.45	$6.99
DEC/NOV Futures 2/13/97	$2.68		$6.99	
Local Fall Prices 2/13/97	$2.37		$6.47	

The decision to plant more acres goes beyond the price of one crop being better than the other. Also, a higher profit potential for one crop doesn't necessarily justify an increase in acres for that crop. The crop rotation/acreage decision has implications for at least two years. Therefore, as I make a decision, I am looking beyond the price or profit potential for the crops today.

The following is an example of a 2000 acre farm and the impact on profitability under three different crop acreage scenarios, assuming an expected price of $2.50 for corn and $6.50 for soybeans.

50/50 Corn and Soybean Rotation

Crop	Acres *	Bu/Acre *	Price =	Gross Revenue	Acres*Bu/A*(Price-Cost) =	Profit
Beans	1000 *	50	* $6.50 =	$325,000	1000 * 50 *($6.50-$5.86) =	$32,000
Corn	1000 *	150	* $2.50 =	$375,000	1000 *150 *($2.50-$2.48) =	$3000
			TOTAL =	$700,000	TOTAL =	$35,000

40/60 Corn and Soybean Rotation

Crop	Acres *	Bu/Acre *	Price =	Gross Revenue	Acres*Bu/A*(Price-Cost) =	Profit
Beans	1000 *	50	* $6.50 =	$325,000	1000 * 50 *($6.50-$5.86) =	$32,000
Beans	200 *	45	* $6.50 =	$58,500	200 * 45 * ($6.50-$6.35) =	$1350
Corn	800 *	150	* $2.50 =	$300,000	800 *150 *($2.50-$2.48) =	$2400
			TOTAL =	$683,500	TOTAL =	$35,750

60/40 Corn and Soybean Rotation

Crop	Acres *	Bu/Acre *	Price =	Gross Revenue	Acres*Bu/A*(Price-Cost) =	Profit
Beans	800 *	50	* $6.50 =	$260,000	800 * 50 *($6.50-$5.86) =	$25,600
Corn	1000 *	150	* $2.50 =	$375,000	1000 *150 *($2.50-$2.48) =	$3000
Corn	200 *	135	* $2.50 =	$67,500	200 *135 *($2.50-$2.91) =	($11,070)
			TOTAL =	$702,500	TOTAL =	$17,530

Based on price and profitability, the decision to plant more soybeans seems to be justified for 1997. However, the additional profit is not significant enough to assume the additional risk plus mess up the crop rotation for 1998. Even with a switch back to a 50/50 rotation in 1998, I would still end up with 20% of the soybean acres on soybean ground.

It appears to me that there is sufficient incentive for those growers with a larger percentage of corn acres to plant more soybeans at current price levels. However, for me to plant 2^{nd} year corn or 2^{nd} year soybeans it is going to take a much greater price incentive to offset the risk. The yields that were used in determining costs per bushel were based on a 10% yield reduction for the second year of a crop. The yield reduction could easily rise to a 15 or 20% reduction under weather or disease stress. Therefore, to switch acres it will realistically take more like a 20% profit margin to insure a reasonable return with the greater risk. So all of a sudden, corn would have to be at $3.49 or soybeans at $7.62 with these costs to even consider switching acres.

Under this cost scenario, a bean:corn price ratio range of 1.8:1 to 2.8:1 would have to be exceeded on either end to draw acres of each particular crop. I don't believe the market is ready to provide the incentive needed to switch acres and then do it early enough in the year to provide the opportunity to easily switch. If the market waits till after the Planting Intentions Report in late March, it is basically too late. In a lot of years, field work has already begun with the application of nitrogen and herbicides. Once these two operations are done, it is difficult to change crops. Also, prices probably will not move fast enough in less than a couple of weeks to beat the start of planting. A lot of times the bigger price moves are in current contracts and not in the Nov. or Dec. contracts that the new crop will be priced off in the fall. In the future, if prices are going to attract acres, they will need to do so in January and February, not April.

NEW TECHNOLOGY

There is a lot of new technology being introduced into farming today. The technology is exciting and has potential but also is very intimidating to a lot of farmers. All the computers, equipment, information, designer seeds, and other technology is going to make farming more complicated in the future. Some of the technology will have great payoffs and some will be white elephants. I believe Bt corn has the potential to increase and stabilize our average corn yields. It will not necessarily increase overall yield potential but will protect what is there. The yield loss to corn borers is often hidden, but with Bt corn and yield monitors it will become increasingly evident the extent of the loss each year. A year or two of side-by-side comparisons of Bt vs. Non-Bt corn should prove the advantage of season long ECB control.

Roundup Ready soybeans will not increase yields in the near future, however, they do have the potential to increase profits per acre by reducing costs. The Roundup Ready system has around two bushels per acre increase over other herbicide programs. The genetics of the Roundup Ready varieties is generally a step behind the new elite varieties, so, the gain from the system offsets the lower yield potential. At this point, Roundup Ready will provide comparable yields. The next generation of varieties, four or five years from now, will have the potential to increase overall yields. The Roundup Ready system will also help combat different weed problems. Most of the herbicide tolerant crops will not really impact yields for several years but will provide new management tools for controlling weeds, hopefully, at a cost savings.

Precision farming has the potential to increase yields. How that exactly is going to happen is yet to be fully determined. Yield monitors are documenting the impact of each of our management decisions and practices. Yield monitors make it easier to compare variables side-by-side, such as varieties, plant populations, fertilizer rates, etc..

LIVESTOCK FEED DEMAND

The livestock industry is rapidly changing and increasing in size of operations. The large operations are making a long term commitment to the business and will not be entering and exiting the market like the traditional farmer of the past. As a result, the demand for feed will be

more consistent from year to year. The operations are becoming increasingly sophisticated in their development of rations and adjusting the ration to achieve a consistent protein and amino acid balance. The demand for grains and soybean meal may be influenced more by the quality of the grain available rather than the supply or price, though these operations are also more likely to switch between alternative feed sources.

CHALLENGES ASSOCIATED WITH 1996 FARM BILL

Many people believed with the new farm program, farmers are getting a windfall in new payments. In reality, payments have dropped 30-50% in comparison to the per bushel amount received from 1989-95. However, the timing of $5 corn with the year with the greatest transition payment have many landlords wanting a piece a piece of the pie, if not all of it. Farmers haven't done themselves any favors either as they have used the transition payment to aggressively bid up cash rents expecting $4 corn for years to come. Landlords have misunderstood the payments but we as farmers have also done a poor job in communicating that government payments are on the decline for the next seven years.

MISCELLANEOUS COMMENTS

I foresee acreage in the Midwest corn/soybean states becoming more consistent from year to year as many farmers move to a 50/50 crop rotation. A lot of farmers that have never planted soybeans are now beginning to plant beans. The states that have the opportunity to plant four or five different crops are more likely to switch between crops with price outlook. The Mid-south is one area that could increase or decrease corn/soybean acres without negatively impacting their crop rotation. In fact, rotation will have a positive impact on their traditional main crops like cotton. Corn acres in 1996 increased in the South with price prospects plus the new freedom not to have to plant all their cotton base acres. The Midsouth had an excellent weather year for first year corn growers. It will be interesting to see how they react after a poor weather year and how corn yields are affected in their area.

The CRP program has had a positive effect upon the uptrend in yield levels of the major crops. By removing marginal land from production, the low yielding fields have been removed from the total acres. The program has been a positive from an environmental perspective without sacrificing much production. Also, in the stress years, the CRP land would have been more severely impacted in its production bringing down the average yield even more.

The fall of 1996 saw grain bins swept clean in Iowa, a situation that has not been experienced in quite some time. It appears the end-users are following other industries with a just in time production mentality. The question is how are industry and government going to react when we do have a year when supplies get tight? From a farmer's perspective $5 corn is nice but I think long term it will hurt our demand base both domestically and internationally. The challenge our farm operation has is to stabilize and increase our yields from year to year, improve grain quality, and be the lowest cost producer.

OUTLOOK FOR DAIRY: 1997 AND BEYOND

James J. Miller
Economic Research Service, USDA

1997 Production

Not enough acceptable quality forage was the dominant milk production story for 1996 and may well be again in 1997. Supplies of good alfalfa were tight in early 1996. The late, cool spring in the Midwest and Northeast resulted in first-cut hay that was late, poor, and low-yielding. The dismal first cut, along with direct climatic effects, produced the spring collapse in milk per cow. Although the later cuttings and the silage were better, forage quality was erratic. Western alfalfa hay production was large in 1996, but supplies of dairy-quality hay remained stretched by the region's now-large dairy herd.

The effects of a 19-percent boost in concentrate ration value were mostly offset by higher milk prices. The milk-feed price ratio averaged just less than the 1993-95 average, while returns over concentrate costs rose 15 percent from 1995. However, the ratio was low during the spring of 1996, limiting the ability of farmers to compensate for forage quality problems.

Milk per cow recovered during the second half. But, second half increases from the weak 1995 output were hardly impressive and were eroding by January 1997. Ironically, the region with the most weakness in January milk per cow was one not in the news because of weather--the Northeast.

Milk per cow will be dogged by forage problems through most of the first half. In addition, the effects of heavy precipitation and mud in California, Washington, and Idaho may persist for 6 to 12 months. First-half milk-feed price ratios probably will not favor much increase in concentrate feeding.

If decent supplies of hay become available on schedule, milk per cow probably will post sizable spring and summer gains. Even so, 1997 growth is projected to average only about 2 percent, not much following a year of no gain. Even this rise may not be attainable if 1997 forage crops have problems or if western stress and mastitis problems are worse than expected.

Declines in milk cow numbers sharpened steadily during 1996. A single year of higher returns did not do much to slow the exit of farms under income stress, particularly not a year of bad forage and high feed prices. Meanwhile, the expansion rate of other operations slowed significantly. It was simply too risky to attempt a major expansion with such highly uncertain forage conditions. These patterns will largely continue through the first half of 1997.

Returns over concentrate costs in 1997 are projected to lose about half their 1996 increase. Even so, returns would remain well above 1992-95. Two straight years of stronger returns should

spark renewed expansions and fewer exits. However, the uncertain forage situation probably will keep these forces on a fairly tight rein until late 1997. Milk cow numbers are projected to average more than 1 percent lower.

Milk production in 1997 is projected to about recover the 1 percent lost in 1996. Although pressures for another jump may be building, they are more likely to emerge in 1998 than in 1997. In fact, most of the uncertainties seem to be lining up on the low side of the current projection.

1997 Use and Trade

In 1996, record quantities of dairy products were sold at very high prices--the classic definition of strong demand. A substantial economic expansion boosted consumer incomes, part of which they devoted to dairy products. Commercial use of milkfat was about unchanged in 1996, as growth in domestic use was enough to offset a decline in commercial exports. Meanwhile, commercial use of skim solids rose fractionally. Cheese sales were strong and use of nonfat dry milk was firm. Fluid sales grew fractionally after a couple of stagnant years. Commercial use of butter declined moderately, partly because of smaller exports.

Expected 1997 income gains should buttress dairy demand. Even so, growth in commercial use may be a little sluggish, particularly during the first half. Although prices to wholesale users will be lower than 1996 through most of 1997, first-half increases in retail prices will be large. In addition, another decline in commercial butter exports is likely. For the year, commercial use is projected to rise about 1 percent on either a milkfat or skim solids basis.

International market prices have edged steadily higher from their summer lows, despite strong production gains in New Zealand and Australia. Importers had to re-enter the markets after letting prices decline during the first half. However, import demand remains somewhat soft. Mexico and Algeria have purchased dry milks, but only in modest quantities. Russia continues to import substantial butter, but some other buyers have backed off.

International market prices are expected to be steady to slightly higher during the rest of 1997. Export supplies probably will be about unchanged, at least until late 1997, and stocks remain modest. However, there is no indication of a real recovery in import demand. Poorer importers continue to shift to less expensive substitutes. A firmer international market and a less tight domestic market should result in larger dry milk exports under the Dairy Export Incentive Program (DEIP). Even so, DEIP exports may not reach the GATT limits unless importers become more aggressive than expected. Total butter exports probably will be slightly lower, as DEIP exports may not make up for the loss of commercial exports. Cheese exports are projected to be about the same to slightly higher.

1997 Prices

The wholesale price yo-yo continues. Early 1996 prices were fairly strong because of good demand. When the demand was joined by spring production drops, summer prices soared. By late summer, production was recovering, sales were easing because of high prices, and stocks

were not declining normally. Price declines were due, but the subsequent crashes proved to be an over-reaction. Butter and cheese prices have both recovered somewhat from December lows.

Additional recovery in cheese prices is expected and may also be in store for butter prices. Given the production uncertainties, wholesale prices may be unsettled through spring and summer.

Farm milk prices in 1996 averaged $14.74 per cwt, up almost $2 from 1995 and almost $1 from the previous record. Milk prices in 1997 are projected to run below a year earlier throughout the year, averaging about $1 per cwt lower. However, projected 1997 prices would be relatively high compared with the late eighties and early nineties.

Retail dairy prices rose 7 percent in 1996, the largest increase since 1990. Almost all the increase was due to farm milk prices, as the farm-retail price spread was almost unchanged. Retail dairy prices are projected to edge lower during the first half of 1997 but will be far above a year earlier. Second-half prices are expected to be about steady and may slip below 1996 levels. The farm-retail spread probably will post large increases, particularly during the first half. The annual average rise in retail prices is projected to be 1 to 3 percent.

The potential production weakness and the evidence of continued strong demand imply that the odds of prices higher than expected are greater than the chances of lower than expected prices. In addition, the possibility of continued volatility in dairy prices will remain until production conditions return to a more normal state.

Beyond 1997: Commercial Use

Commercial use of dairy products is projected to grow just barely faster than the 1-percent increase in population. The total will continue to be a mix of strong and weak products. However, some of the individual product trends may be considerably different from the past.

The days of automatic shifts from whole milk to 2 percent milk are over. In recent years, whole milk sales have been about steady while 2 percent milk use has dropped. Meanwhile, sales of skim milk have grown sharply since the late eighties, after being stagnant for decades. It is not clear how the complex mix of demographic, dietary, eating pattern, and taste patterns will resolve themselves, but fractional trend increases are projected.

Cheese sales are expected to grow, although percentage rises from the current high base are apt to be smaller than in the past. Cheese's convenience, versatility, diversity, and dish-enriching capabilities will keep it in a strong position. However, gains in cheese use may not be quite as immune to bad years as in the past.

Milk solids have well-known capabilities to improve the quality of many processed foods--even when used in fairly small amounts. As long as they remain relatively inexpensive, milk, cream, butter, dry milk, and condensed milk probably will be used in larger amounts in processed foods. This trend is a reversal of the pronounced downtrend of most of the sixties, seventies, and eighties.

Retail butter sales will depend largely on where relative prices of butter and margarine settle. Most of the recent butter gains are expected to remain, but the overall table spread market will remain under pressure. Sales of soft products are projected to be about steady.

Beyond 1997: Milk Production

Annual declines in milk cow numbers are projected to be less than 1 percent. Western growth will continue but at a slower expected rate. There probably will be fewer areas with the potential for explosive growth and regional alfalfa supplies will be more limiting than in the past. However, development of large, industrial-style farms probably will accelerate in northern dairy areas. In addition, use of intensive grazing techniques will prolong the viability of some dairy farms, particularly in areas of marginal agriculture.

Milk per cow is projected to grow slightly less than 2 percent per year. Milk-feed price ratios are projected to average less than 1.6, relatively unfavorable to increased concentrate feeding. Further adoption of bST will help support increases in milk per cow. However, experience so far would indicate that the effect of bST on increases in milk per cow will be quite gradual.

In the last 10 years, there have been 2 multi-month periods with milk per cow below a year earlier, along with a sprinkling of individual months. Since World War II, the only other such periods were twice in the mid-seventies, when milk-feed price ratios hit extraordinarily low levels, and in 1984, when farmers were paid to cut milk marketings. This increased instability of milk per cow probably will remain with us. Cows are more concentrated geographically than in the past, increasing the chances that local weather conditions do not "average out" nationally. Also, the current very heavy levels of concentrate feeding limit farmers' ability to compensate for poor forage by boosting grain feeding.

Milk production is projected to grow slightly more than 1 percent per year, significantly slower supply shifts than during the eighties. Growth in milk output may be less steady as well as slower. Forage and weather conditions may have more effect on when farms expand or exit, as well as affecting milk per cow.

Beyond 1997: International Markets

International dairy markets are expected to be less prone to periods of very low prices, but prices are projected generally to be below U.S. prices. The GATT export disciplines will forestall surges in subsidized exports. However, production by non-subsidizing exporters is expected to grow in response to the higher international prices of recent years. Average growth of 4-5 percent in Australia and New Zealand seems quite attainable as grazing land is converted to dairy use. Milk output in parts of South and Central America also is likely to grow. On the other hand, milk production may be weak in much of Eastern Europe, as the transition from state farms to private production has been difficult. The expansion in world export supplies is expected to about keep pace with world import demand. Although dairy imports may grow substantially in areas such as East Asia, the recent higher prices may lead to use of substitutes in some of the poorer traditional importers.

Export supplies of butter are projected to be fairly steady. EU exports should not vary much and the United States will be a smaller supplier. Most of the increase in Oceanic milk production is expected to go into cheese, leaving butter exports about the same. Import demand from the Former Soviet Union, the Middle East, and North Africa is expected to be fairly solid, but demand for butter is not projected to grow much.

Export supplies of dry milks are also expected to be fairly steady. Import demand will grow in some areas. The westernization of Asian diets should result in demand boosts. On the other hand, a number of countries are developing whey-based beverages to replace more expensive nonfat dry milk. Total import demand is projected to be strong enough to generate a gradual uptrend in international dry milk prices.

The restrictions on EU cheese subsidies and growing import demand are expected to make the cheese markets the strongest of the international dairy markets. Pizza alone is creating markets for cheese where none existed before. However, aggressive expansion of cheese capacity in New Zealand and Australia promise to keep cheese prices from deviating too far from parity with butter and nonfat dry milk.

Beyond 1997: Prices

Prices that keep production and commercial use balanced are projected to edge higher, but trailing general price levels. Aggregate demand shifts are expected to be similar to the past, but supply shifts probably will be considerably more modest than during the eighties. Commercial exports are expected to only occasionally be important for domestic market prices.

Milk prices probably will stay relatively volatile. Growth in western cheese capacity should help curb some of the large price disparities of recent years, and the industry may be learning the need for larger stock levels. But, year-to-year production changes probably will be less certain, and price disruptions from the international markets may be more common. In addition, demand response may be changing as the retail market shrinks in importance relative to restaurant and ingredient markets.

Market Implications of Changes in Dairy Cooperatives

by
Albert J. Ortego, Jr.

Introduction

Changes in dairy cooperatives have been taking place for many years. Many were the results of changes in relevant geographic market. Many were reaction to changes in the structure of the milk processing, manufacturing, and distribution sector of the dairy industry. Some changes were due to competitive pressures to increase market share, to enhance efficiency, and to gain market power.

There has been a steady decline in the number of dairy cooperatives. This downward trend in numbers has also occurred in number of dairy farmers, milk processing plants and milk manufacturing plants. These changes are well known to those engaged in the dairy industry. Yet, a quick review of the number, size and location of dairy cooperatives will help with a discussion of implications of changes.

Between 1980 and 1995, the number of dairy cooperatives in the United States declined from 435 to 241 (Table 1). The rate of change in number of dairy cooperatives has decreased since 1985, particularly when compared to the changes that took place during the period of 1965 to 1985. In 1980, dairy cooperatives marketed about 77 percent of all milk sold to plants in the United States. Today, that percentage is estimated to be above 85 percent. The activities of these cooperatives range from small local bargaining cooperatives to large multi-state diversified cooperatives.

Table 1. Number of Dairy Cooperatives, Total Membership, Volume of Milk Marketed and Share of Total Milk Marketed in the United States, Selected Years.

	No. of Cooperatives	Total Membership *	Milk Marketed	Market Share
			(million lbs.)	
1980	435	167,239	95,634	77
1987	296	137,171	105,798	76
1992	265	123,779	122,622	82
1995	241	117,313	NA	NA

* Number of members eligible to vote; not number of dairy farms.
Source: Rural Business - Cooperative Service, United States Department of Agriculture, Washington, D.C. 202 50.

The range in sizes is clearly shown by the shares of the largest 4 and largest 20 dairy cooperatives. The 4 largest cooperatives receive more than 30 percent of the milk received by all

dairy cooperatives, which is more than 25 percent of all milk delivered to U. S. milk plants. The largest 20 cooperatives market more than 72 percent of all coop member milk and more than 60 percent of all U.S. milk marketed. The remaining 200 plus dairy cooperatives are very small (on average) when compared to the largest four or largest twenty. Concentration of cooperatives in the production of specific dairy products varies widely. The largest 20 cooperatives, producing dry milk products, manufacture 97 percent of the total produced by cooperatives, and about 80 percent of all dry milk products produced in the U. S. [1] Cooperatives process and package less than 15 percent of all fluid milk sold in the U.S. All fluid milk processed by cooperatives is processed by the largest 20 cooperatives. Cooperatives have an even smaller share of the production of soft products such as ice cream, cottage cheese and yogurt.

Because some dairy cooperatives have members in as many as 30 states, the location of cooperative organizations are difficult to specify. For this discussion, the location of the cooperative will be the area in which its headquarters are located. On this basis the number of dairy cooperatives are largest in the midwest and northeast and fewest in the south central area. According to USDA's Rural Business-Cooperative Service, New York headquartered 61 dairy cooperatives in 1995, more than any other state.[2] Minnesota was second with 48 and Wisconsin was third with 35. The number of cooperatives seems to be larger in the more traditional dairy areas and where the manufacture of dairy products has been an important use of the milk supply.

Market implications of changes in dairy cooperatives needs to be approached from two aspects. First is the implications of change in large regional cooperatives whose membership extends over large areas. Second is change in the smaller cooperatives whose membership is more local.

Change in Large Cooperatives

Large dairy cooperatives have become more diversified. These organizations sell milk to other milk handlers, provide balancing services (within the week and seasonally) to fluid milk customers, own and operate manufacturing facilities, market dairy products, and some process fluid milk products. Implications of change will be discussed in terms of member relations, customer relations and market influences.

Member Relations. The broader the territory over which membership extends, the more difficult member relations become, and the more important member loyalty and support become. As the area of membership widens the common interest of members diminish. Regional differences in primary interest of producers make it difficult to establish cooperative policies or market strategies acceptable to all regions. These differences reduce member support especially when policies and procedures are perceived as not in their best interest. These problems are reflected in the pricing policies, the pooling of proceeds from the sale of milk, and the pooling of the cooperative's expenses. Membership in regions with high Class I use have considerably different interests from those in regions with very low Class I use. It becomes more difficult for the Cooperative Board and Management to communicate effectively with a diverse membership

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[1] K. Charles Ling and Carolyn Betts Liebrand, Marketing Operations of Dairy Cooperatives, ACS Research Report 133, Agricultural Cooperative Service, USDA, Washington D.C. page 31
[2] Farmer Cooperative Statistics, 1995, PBS Service Report 52, Rural Business-Cooperative Service, USDA, Washington, D.C. page 5.

scattered over such a wide area. In addition, the membership often finds it difficult to accept that they are an integral part of an organization headquartered 4 or 5 states away.

Dairy farmers don't visualize their market as the broad membership area of the regional cooperative. A common perception is that their "market" is the local Class I market or the nearby cheese plant to which their milk is regularly shipped. Many believe they are paying for high overhead and unnecessary expenses such as frequent meetings that accomplish little and cost much. In many areas, the large cooperatives members receive a lower pay price than do members of small local coops and non-coop producers. Payments for milk which are below the minimum order blend price makes members question the value of membership and effectiveness of its management. Too often, there is the perception that the board and membership are more concerned with the cooperative corporation and the employees rather than the members. Today, some large dairy farms recognize that costs per hundredweight are less to market their milk than that of small producers. This condition gives these producers greater options and more market opportunities. A few large producers can use the competitive advantage of their size and market their milk, cooperatively or otherwise, for a better return.

What are the implications of all this? These conditions, perceptions and the currently low net returns to dairy farming, cause many member producers to seek other options. Members leaving the large regional cooperatives do one of the following: (1) join competing, usually smaller more local, cooperatives; (2) ship milk as a non-coop producer to a proprietary milk plant; or (3) form another cooperative. Why do some producers want to join or organize more local cooperatives? Some reasons are: (1) they feel that they can market their milk at a lower cost; (2) they do not want to make the investment in manufacturing and other further processing facilities that the regional cooperatives make; (3) they do not want to pool proceeds or costs with distant producers; and (4) they believe they can have more input in decisions of the organization.

Loss of membership diminishes the effectiveness and efficiency of regional cooperatives in any area where such defection occurs. Effective pricing by a cooperative requires the ability to establish a price on practically all milk competing for sales in the area. This problem is one that has prevailed in the Southeast and Southwest. Attempts to use a federation of cooperatives and or common marketing agent has had limited success in overcoming this pricing problem.

Defection of members reduces operational efficiencies, such as in the collection or assembly of milk, in performance of balancing services, particularly seasonal balancing, in quality assurance costs, and in accounting. These inefficiencies add to the cooperatives difficulty of paying as high a price as its competitors.

Large regional cooperatives will continue to have member relations problems. The skepticism of some producers will remain with cooperatives. Skeptical producers will actively seek alternatives, particularly during periods of low net returns to milk production. Some Class I milk handlers prefer to purchase from non-member producers so that any over order prices can be paid directly to producers without having to pool the premium over a usually lower Class I use of the cooperative. More and more of the total price will likely be established outside federal order minimum prices. (This is conjecture because much depends on the pricing structure and policies established under the mandated order reforms now underway.) How to cope with the sharing of over-order premiums will continue to be a challenge for regional cooperatives in the future.

Customer Relations. Fluid milk plant operators that purchase milk from cooperatives want a supplier that can: (1) provide milk that meets the plants quality standards; (2) deliver milk as scheduled; (3) replace any rejected loads quickly; (4) can balance supply to meet plant's daily and

seasonal needs, (5) assure an adequate supply at all times, and (6) assure that the price will be competitive with that paid by competing handlers.

Regional cooperatives can readily supply handlers with these desired services. The real concern arises as to what these services are worth to the handler vs what cooperatives charge for the services. Most cooperatives charge a uniform amount for specific services, yet the cost of providing such service is not uniform for all customers. Cost of services vary by location of plant relative to the location of supplies and relative to the location of balancing plants. The cost of some services vary by size of plant and the number of dairy products produced, which affects the extent of balancing required.

While there is room to improve the pricing of services rendered, competition often results in the provision of these services without charge. As is the case of over order prices, a milk handler that is the customer of large cooperative cannot pay for services and successfully compete if other handlers are receiving the services free. The inability to recover these necessary costs add to the coops problem to pay its members a competitive price.

As cooperatives, both large and small, continue to merge or consolidate, how they price services rendered will become more complicated. Also, not all customers will require or want the same set of services. Also, as concentration continues in dairy cooperative, proprietary milk handlers will have less choice as to which coop it selects to do business. It may become a choice of the large regional coop in the area or a supply from non member producers tied directly to that plant.

Market Influences. Cooperatives have long been involved in the processing and/or manufacturing of dairy products, particularly cheese, nonfat dry milk and butter. Cooperatives produce about 66 percent of the butter, 80 percent of the dry milk products, and about 45 percent of the natural cheeses produced in the U. S. Cooperatives involved in processing some or all of their members' milk include both small and large cooperatives. However, the large cooperatives are very dominant in these activities. The 20 largest cooperatives produce about 97 percent of all butter, dry milk products, and natural cheeses produced by U. S. cooperatives.[3]

Several regional cooperatives have expanded their activities in further processing. Some have been more successful than others in these type endeavors. Some are integrating further into the marketing chain. By consumer packaging, in their own brand and through private labeling for retail food chains, these organizations are trying to capture more of the value added through processing and marketing for their members. Efficient processing, packaging and marketing operations are necessary for effective integration into the consumer products market. Large scale operations are necessary to obtain the efficiencies necessary to compete in today's food markets. Large dairy cooperatives are moving more in this direction. More mergers will result as cooperatives strive to become more efficient and effective in the consumer products market. Mergers will continue to occur as cooperatives work to maintain or increase their share of specific dairy product markets. Such mergers will reduce the number of firms competing in major dairy product sales. Yet, the total market share of cooperatives will likely change very slowly. Integrated dairy cooperatives have opportunities to expand globally as economic growth throughout the world continues. The higher standard of living is changing the eating habits in many countries and this offers opportunities for more dairy product sales.

[3] op. cit. Ling and Liebrand, page 31.

Current changes in large cooperatives indicate that these organizations will have a greater influence in dairy product markets in the next few years. The influence will become more important in the consumer packaged products.

Changes in Small Cooperatives

Small dairy cooperatives vary from small manufacturing cooperatives to organizations existing only to participate in the coop payments of the New York Federal Milk Marketing Order. Some small cooperatives sell milk to a single proprietary dairy company and are often referred to as "captive coops." Small cooperatives generally have the solid support of their members and are viewed by members as serving their needs very effectively. Yet the number of such organizations continue to decline.

A reduction in the number of milk plants has been occurring for a long time and will continue to occur in the next few years. As the number of dairy companies and the number of dairy plants become fewer, it becomes more difficult for the small cooperatives to adequately serve their customers' needs. Consolidation of plant operations often results in their supplying coop to also consolidate. The changing size of the relevant economic market will continue to cause small cooperatives to merge with other cooperatives. However, there will continue to be small cooperatives providing limited marketing services to customers who prefer to deal with these type organizations. Membership will be primarily by producers who prefer not to join large regional cooperatives or who are dissatisfied with such large cooperative.

From time to time new cooperatives will be formed by producers who feel they can obtain a better return with "their own" organization than they are currently doing with their present cooperative. In times of low net returns to milk production, such occurrences will be more frequent.

In many parts of the country producers can attract producers from a cooperative by offering them a higher price. The ability to lure producers from cooperatives for a slightly higher price continues to limit the extent to which cooperatives can exercise any market power. This condition will likely prevail for several years.

Summary

The number of dairy cooperatives will continue to decline as both large and small cooperatives continue to merge. Producer numbers will also continue to fall. Thus, the number of members will not increase as much as the volume of milk handled. The surviving producers will be larger and better dairymen. The larger volume of milk per cooperative should help reduce costs per hundredweight. However, if the added volume is obtained over wide areas and is not a high proportion of the total milk supply in the area, then efficiencies will not be as easily achieved..

Large regional will continue to have member relations problems because of the absence of common interest and objectives of its members. Pooling of proceeds and costs over wide areas add to the concerns of equity and fairness. Efforts to improve communications is useful but can add to the cooperatives costs.

Large dairy cooperatives have the ability to supply customers with the needed and/or desired services. Pricing these services need to be improved as cost to provide services often

differ among customers, even in the same area. Some cooperatives will continue to provide services free or at low charge in order to maintain or obtain custoners.

By continuing to vertically integrate in the marketing of dairy products, cooperatives will become amore influential player in dairy markets. Successful ventures in vertical integration will help offset membership costs. Expansion in the export markets may offer opportunities for future expansion.

Small cooperatives will continue as part of the industry. Many producers still want to operate as a separate and more local organization. Some handlers also prefer to do business with local producer organizations. As the number of milk plants decline, the small cooperative may be required to operate over a larger territory. A few real large producers will continue to seek opportunities offered by their size.

OUTLOOK FOR U.S. TOBACCO

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The outlook for U.S. tobacco through the end of the 1990's improved as we traversed the middle third of the decade. After a ten-year decline, cigarette consumption leveled off in the past four years. Cigarette export volume gains, which seemed transitory earlier in the decade continued, boosting total output. Lower-than-expected leaf production in the past two years due to weather and disease, combined with higher manufacturers' purchase intentions and reduced stocks boosted quotas for the past and upcoming season.

Near-term Situation and Outlook

For the next few years, domestic cigarette consumption is likely decline slowly from current 487 billion pieces, mostly due to higher taxes and greater restrictions on where people can smoke. The cumulative effects of regulations limiting where people can smoke, higher taxes in many States, and advertising restrictions and health concerns have resulted in an equilibrium consumption of about 2,500 cigarettes per capita and with about 25 percent of the population smoking cigarettes. A few years ago, State tax increases and increased regulation of smoking in public areas and workplaces were the major forces depressing cigarette consumption. The threat of Federal excise tax increases added to the industry's glum mood. The tax increase never materialized and lower prices since 1993 helped nullify the other factors. All of these factors could regain importance in the future. Now, in the final third of the decade, the major challenges to cigarette manufacturers are from litigation and FDA regulation.

Cigarette exports are expected to continue rising through the end of the decade. Offshore production has not materialized to the extent previously anticipated, in part because of the demise of the 25-percent limit on foreign tobacco use in U.S.-manufactured cigarettes. The Tariff Rate Quota now in effect has effectively reduced the cost of producing cigarettes in the United States by allowing greater use of lower-priced imported leaf. Also, effective publicity campaigns worldwide have generated strong demand for U.S. cigarette brands, most of which are produced in the United States.

In 1996, U.S. growers produced 1.6 billion pounds of tobacco valued at an estimated $2.7 billion compared with 1.3 billion pounds valued at $2.3 billion in 1995. That's a 23 percent gain in volume. For the 1996 season, the most notable factors were the hurricanes which destroyed significant amounts of Coastal Plain flue-cured and another outbreak of blue mold in the burley belt, both of which resulted in tighter-than-expected supplies, high prices regardless of grade, virtually no loan takings, and low cooperative stocks at the end of season. The leveling off of cigarette consumption, advancing cigarette exports, a reprieve in the threat of Federal tax increases, and slightly higher leaf exports combined to create strong demand.

U.S. leaf exports increased nearly 6 percent in 1996, reflecting a smaller price differential between U.S. and foreign leaf, higher U.S. production, and low world leaf stocks.

The U.S. tobacco outlook for 1997/98 reflects the lowest domestic stocks in the post-war era and increased use by cigarette manufacturers. After flue-cured prices gained 4 cents per pound and burley prices have so far averaged 6.8 cents per pound above the previous season, what's in store for 1997? Prices in 1997 will depend on weather, farmer response to the high quota, and global conditions, which Pete Burr will discuss in the following presentation. The flue-cured quota for 1997 is 705 million pounds, with an effective quota of about 1,020 million pounds. The burley quota is 705 million pounds with an effective quota of 900 million, the highest since 1971 when burley first had poundage quotas. Given these large increases in both the flue-cured and burley quotas for 1997, total U.S. tobacco production is expected to increase, perhaps reaching 1.7 billion pounds. Labor and barn space may in short supply and could reduce the amount of the quota actually grown. Prices are likely to decline from this season's level. With price supports at $1.62 for flue-cured and $1.76 for burley, loan takings will almost certainly increase.

After falling in 1995/96, use in 1996/97 is expected to regain lost ground but not quite reach 1994/95's levels. U.S. production advanced 22 percent in 1996/97 but low carryin stocks limited supply to 3.7 billion pounds.

U.S. cigarette production in 1996 is expected to exceed 750 billion pieces, 1 percent higher than last year. Retail tobacco product prices in calendar 1996 averaged 3.2 percent higher than in 1995. State excise taxes weighted by sales average 32.4 cents per pack in July 1996. State tax rates vary from 2.5 cents per pound in Virginia to 82.5 cents per pack in Washington State. Two States raised their tax rate in 1996, and the Federal tax remains at 24 cents per pack.

Cigar production and consumption, especially of premium brands continues to expand. Cigar consumption in 1996 are expected to increase nearly 20 percent over 1995. Continued gains in premium cigar sales for the next few years are expected.

In the longer term, the U.S. cigarette industry and tobacco growers could face the following challenges:

* Increased competition from other major tobacco producers.
U.S. growers cannot let the current season's strong demand lessen their commitment towards higher quality and price competitiveness.

* Specter of increased Federal or State taxes on cigarettes.
The potential for State tax increases is certain, and sooner or later, Federal tax increase proposals will re-emerge.

* Potential for significant changes in the tobacco production quota and price support program.
Parts of the tobacco program have narrowly withstood proposals for their elimination in recent sessions of the U.S. House of Representatives.

* Increased regulation by FDA or OSHA
As evidenced by the February 10 hearings in North Carolina, the push to increase regulation will almost surely continue.

* Litigation and/or settlement costs large enough to affect profits or drive up cigarette prices.
Continued litigation is certain, while the potential costs remain unknown.

THE FOREIGN TOBACCO OUTLOOK

by

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Tobacco plays a very important role in the economic well being of many nations worldwide. Preliminary assessments indicate that the 1997 tobacco crop will be larger in several of the world's major producing countries including Argentina, Brazil, Malawi, Mexico, Turkey, Zimbabwe, and China. China is by far the world's leading leaf producer, accounting for nearly 40 percent of the world's leaf tobacco crop in 1996. Total world unmanufactured tobacco output in 1996 reached 7.17 million tons (farm-sales-weight), up 10 percent from 1995.

Brazil:

Brazil's production of total unmanufactured tobacco is expected to reach 525,000 tons in 1997, up about 16 percent from 1996. Much of the rise in output stems from increased plantings due to industry expectations that foreign demand for Brazilian leaf will be higher in 1997 and that cigarette production for export will also increase. Yields are forecast to rise in 1997 as favorable weather conditions which prevailed early in the growing season are expected to continue. Flue-cured tobacco is the leading tobacco type grown in Brazil. Flue-cured output in 1997 is expected to increase by more than 50,000 tons from last year, reaching over 368,000 tons. Burley output is forecast to increase by over 17,000 tons, reaching 87,000 tons. Brazil's leaf exports in 1997 are expected to total nearly 273,000 tons, up almost 9 percent from 1996. Brazil's export prices for the 1997 season are expected to be attractive to foreign buyers. The European Union and the United States are by far Brazil's leading leaf export markets. Other export markets for Brazilian leaf include Japan, the Philippines, and South American markets. In 1997, Brazil is expected to import about 7,000 tons of leaf tobacco, much of which is dark air-cured and dark sun-cured tobaccos. Suppliers of Brazil's leaf imports include the European Union, Argentina, and Zimbabwe.

Argentina:

Argentina's leaf output is forecast to reach 123,000 tons in 1997, an increase of over 25 percent from 1996. Production of flue-cured tobacco, the leading type grown in Argentina, is expected to jump 24 percent to 73,000 tons, while burley output should increase 40 percent to almost 38,000 tons. Total leaf plantings are expected to increase 15 percent in 1997 due to higher grower returns last year and an expected strengthening in the foreign demand for

Argentine leaf due to favorable prices. Argentina is expected to export 60,000 tons of unmanufactured tobacco in 1997, up about 25 percent from the 48,000 tons exported in 1996. Flue-cured tobacco is the leading tobacco type exported and is likely to reach 40,000 tons this year, 25 percent more than in 1996. Burley exports are expected to reach 15,000 tons this year, an increase of 36 percent over 1996. Argentina's leading export markets for leaf tobacco are the European Union, the United States, Brazil, Japan, and Venezuela. Argentina is not a significant leaf importer. For 1997, imports are expected to total 3,000 tons, down nearly 52 percent from last year due to increased production levels in 1997.

China:

China's tobacco production is forecast to reach nearly 2.6 million tons in 1997, up 50,000 tons from 1996. Flue-cured tobacco accounts for over 90 percent of China's leaf output. The tobacco monopoly's policy of discouraging the production of lower quality tobacco is still in effect. This includes the use of procurement prices and other incentives to influence the market and help relocate tobacco production to more desired locations, including efforts to move tobacco out of the fertile Yellow River Valley provinces. Nearly 90 percent of China's leaf output is destined to the domestic cigarette market.

Although several official Chinese sources have reported a rise in anti-smoking activities and a subsequent decline in smoking, other reports from Beijing and Shanghai, do not support this. In Beijing, 60 percent of males between the ages of 20 and 40 smoke. Cigarette production is projected to increase approximately 2 percent in 1997.

China has come onto the scene in recent years as a significant leaf tobacco exporting nation. However, after rising to nearly 74,000 tons in 1994, exports have fallen off. However, for 1997 China's leaf exports are expected to be up about 3 percent, totaling 60,000 tons. China's leaf imports are expected to be down over 28 percent in 1997, to 15,000 tons. Nearly all of China's imports are flue-cured type tobaccos supplied out of Zimbabwe.

Mexico:

Total unmanufactured tobacco output in 1997 is expected to reach about 49,000 tons, up slightly from 1996, and about 8 percent higher than in 1995. The Mexican tobacco industry is expected to rebound slightly as Mexico's economy shows signs of improving. The domestic cigarette market is likely to show moderate growth in the short-term which is expected to push the demand for leaf by domestic cigarette manufacturers higher in 1997. Production of burley tobacco, the leading type grown in Mexico, is expected to total over 27,000 tons in 1997, up from 26,500 tons last year. Flue-cured production is projected to reach 8,200 tons this year, up slightly from 1996. Mexico's leaf exports, which are nearly all burley type tobaccos, are forecast to remain at 13,000 tons in 1997, about the same level as in 1996. Leaf exports improved in 1996 as the Mexican peso devaluation late in 1994 kept Mexican leaf competitive on the international market. The United States is by far Mexico's leading export market for

burley tobacco. Mexico's leaf imports are projected to total about 3,000 tons in 1997, unchanged from 1996. The relatively low level of imports can be attributed to ample domestic supplies of sufficient quality tobaccos for domestic use.

Zimbabwe:

Zimbabwe's flue-cured production has steadily increased since 1994 and is again expected to increase in 1997. Output this year is forecast at over 235,000 tons, up almost 17 percent from 1996 when 201,550 tons were produced. Summer rains were abundant last year and resulted in what is expected to be ample water for irrigation throughout the 1997 growing season. A good quality crop last year, coupled with a tighter world supply situation pushed prices higher in 1996. This is expected to provide a strong incentive to growers to increase plantings this year.

Zimbabwe's burley output dropped almost 40 percent in 1996 to 6,175 tons, but is expected to rebound in 1997 to almost 8,000 tons. Much of the decline last year was due to poor prices, the lack of a local auction, and difficulty getting seed in time for planting. However, a new auction has opened in northern Zimbabwe and should provide better marketing opportunities for burley farmers. Additionally, a "seedbed scheme" developed to encourage planting of burley will be expanded for the 1997 marketing year.

Malawi

Exports are the lifeblood to Malawi's tobacco industry with over 95 percent of the tobacco crop going into the export market, and nearly 70 percent of the country's foreign earnings generated by tobacco trade. Burley accounts for over 80 percent of Malawi's leaf production. For 1997, Malawi's burley output is expected to reach 135,000 metric tons, up 14 percent from 1996, and 33 percent more than in 1995. Malawi's burley exports are expected to reach about 90,000 tons this year, up 10 percent from 1996. In addition to improved export prospects, much of the rise in Malawi's leaf output this year is a direct result of increased tobacco production by the smallholder growers. Prior to 1991, only estates, which are classified as production units of at least 10 hectares in size, were allowed to produce burley and flue-cured tobaccos. However, this policy has been largely eliminated and smallholders, which tend to be the poorer growers, are now permitted to produce these types. Other leaf types grown include flue-cured, oriental, and dark tobacco types. For 1997, Malawi's flue-cured production is expected to reach about 20,000 tons, about 5,000 tons more than in 1996, while dark leaf output should reach about 9,000 tons, up from 8,300 tons last year. Flue-cured exports should come in at almost 15,000 tons, and dark leaf exports of about 9,000 tons are expected. The leading export markets for Malawi's leaf include Europe, Asia and the United States.

Turkey

Although there has not been a change in the Government of Turkey's policy to limit oriental tobacco production in order to resolve the costly problem of overproduction and high stocks, output of oriental tobacco is expected to increase 7 percent in 1997, totaling 235,000. Turkey's oriental output represents about 96 percent of the country's total leaf production. Flue-cured output in 1997 is expected to increase about 12 percent to 6,000 tons, while burley should reach 1,700 tons, unchanged from 1996. Turkey's exports of oriental leaf tobacco plays a vital role to the leaf industry. Oriental exports are expected to reach 120,000 tons in 1997, down about 8 percent from 1996. Although higher oriental production in competing countries is expected to push Turkey's exports down slightly this year, it is expected that Turkey's oriental trade will remain strong due to export price liberalization, and reduced availability of good quality oriental tobaccos in other producing countries. Until 1994, the United States was Turkey's sole supplier of non-oriental tobacco, used mostly to produce "TEKEL-2000" and "TEKEL-2000" Lights. However, there is an increasing incentive to import lower priced flue-cured tobaccos from non-U.S. sources for use in the new "value brands". High inflation and the devaluation of the Turkish lira have reduced consumers' purchasing power and led to an increase in the market share of medium and lower priced brands.

LITIGATION AND THE U.S. TOBACCO INDUSTRY

Keith Teel
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CLASS ACTIONS

- In 1994 a group of approximately 60 plaintiff lawyers formed a consortium to file a class action lawsuit against the tobacco industry.
  - The result was the Castano litigation, filed in federal court in New Orleans
  - The federal district judge certified a nationwide class action, in which the basic contention was that tobacco companies concealed the claimed addictive nature of nicotine
  - After that, the U.S. Court of Appeals for the Fifth Circuit reversed, and ruled that the case was inappropriate for class action treatment, because
    - individual issues predominated over issues common to class
    - the claims were too new and untested, and therefore inappropriate for class treatment
    - the differing laws of every state would need to be considered to resolve the case – an enormous burden to the court and the litigants
  - This last decision was not appealed, and the case ended

"BABY" CASTANO CLASS ACTIONS

1. After the Fifth Circuit Castano decision, the same group of lawyers started filing cases with basically the same contentions in various state courts, on behalf of classes of people who lived in those states. These are referred to as "baby" Castano cases.

2. Baby Castano cases have been filed in

Alabama	New Mexico
Arkansas	New York
District of Columbia	Ohio
Louisiana - 2 Cases Cigarettes Smokeless Tobacco	Pennsylvania Puerto Rico
Maryland	West Virginia
Minnesota	

3. None of the cases have yet been certified for class treatment

WHAT IS A MEDICAID LIABILITY LAWSUIT?

- A lawsuit brought by a state seeking to recover the costs under the Medicaid program of treating people whose injuries are alleged to be caused by tobacco use

- Some cases also seek to recover other public monies (not Medicaid costs) spent for health care treatment for indigents or for insurance premiums for government workers

KEY FEATURES OF MEDICAID LIABILITY CASES

- Each state is represented by plaintiff personal injury lawyers ("trial lawyers")

- Damage claims in media are huge, but state recoveries, if any, will be small

- States plan to use only statistics to prove causation and damages

- Most state attorneys-general claim that they are not seeking to put the industry out of business, but it is difficult to reach any other conclusion

WHERE ARE MEDICAID LAWSUITS ON FILE?

Arizona

Connecticut

Florida

Hawaii

Illinois

Indiana

Iowa

Kansas

Los Angeles

Louisiana

Maryland

Massachusetts

Michigan

Minnesota

Mississippi

New Jersey

New York State

New York City

Oklahoma

San Francisco and surrounding counties

Texas

Utah

Washington

West Virginia

Wisconsin

STATES' "PROFIT" FROM TOBACCO

State	Claimed 14-Year State Medicaid Costs 1980-1993 ($ millions)[1/]	State Cigarette Excise Taxes 1980-1993 ($ millions)	State "Profit" ($ millions)
Florida	609.87	4,591.13	3981.26
Minnesota	489.98	1,648.76	1,158.77
Mississippi	83.93	567.81	483.88
Texas	885.21	5,529.88	4,644.67

1/ SOURCE: Centers for Disease Control. These figures are disputed by the tobacco industry, but are presented here for comparison because they represent the claims of the states.

U.S. HORTICULTURAL OUTLOOK FOR 1997 AND BEYOND

Edmond Missiaen
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In 1997, the U.S. horticultural sector is expected to generate 35 percent of farm crop cash receipts and about 19 percent of agricultural export value. The farm value of U.S. horticultural crop marketings is projected to reach $36 billion in 1997, up an estimated 4 percent from 1996 and 2 percent above 1995. The value of horticultural marketings is projected to increase $1.2 billion to $1.3 billion annually during 1998-2005. Part of this value will be generated by export sales. The value of horticultural exports is expected to total around $10.5 billion in 1997 and based on current trends, could grow to $16 billion by 2005.

Commodity Situation and Outlook

Grower Receipts Down in 1996

Vegetable receipts in 1997 will likely increase slightly as higher prices boost revenue, especially for fresh vegetables. Vegetable and melon receipts are expected to exceed $15 billion by the year 2000. In 1996 grower cash receipts from the sale of all vegetables and melons is estimated to have declined slightly to $14 billion. Increased fresh vegetable sales were offset by reductions in the value of processing vegetables, potatoes, and dry edible beans.

Fruit and tree nut grower receipts may decline slightly in 1997 as the impact of expected large supplies is outweighed by lower prices. By the turn of the century, grower receipts for fruit and tree nuts are expected to exceed $12 billion. In 1996, cash receipts for fruits and nuts rose about 5 percent from the $10.8 billion estimated for 1995. Increases were widespread in the sector as both citrus and noncitrus crops like apples, grapes, oranges, and almonds rose in value.

Rebounding floral sales and continued strong economic growth should push grower receipts for floriculture and environmental horticulture (cut flowers, potted plants, turfgrass, and related nursery/greenhouse crops) close to $11 billion in 1997 and over $12 billion by the turn of the century. Grower cash receipts reached an estimated $10.6 billion in 1996, up 4.7 percent from 1995. All segments of the green industry, including foliage and flowering plants, bedding plants, and nursery crops are expected to show increases this year.

Fresh-market vegetables

Responding to lower prices during 1996, fresh-market vegetable growers are expected to reduce acreage in 1997. Given trend yields, reduced area would result in flat or slightly lower supplies. Lower supplies and consistent demand should result in slightly higher prices throughout the marketing chain. Grower returns, which declined in 1996, are projected to recover last year's losses and return to 1995's record high. Grower prices for fresh vegetables in 1996 averaged 10

percent below a year earlier, because of strong domestic production and larger imports.

The United States now imports about 11 percent of total fresh vegetable supply with Mexico the major foreign supplier. During 1990-94, imports accounted for 8 percent of fresh vegetable supply. Import penetration is strongest for eggplant (43 percent), cucumbers (37 percent), and asparagus (35 percent) but has grown most rapidly for tomatoes (37 percent).

For a variety of reasons (such as rapidly changing markets, strong consumer demand, etc.), several fresh vegetable/melon markets have stood out in the 1990's. These include tomatoes, carrots, leaf/romaine lettuce, bell peppers, onions, and watermelon.

Tomatoes: The growth in tomato imports may be heralding a change for the industry, especially during the winter season.

- Improved varieties of tomatoes appear to have found favor with consumers, encouraging major retailers to purchase them from Mexico, the leading winter-season source.
- Consumers have also expressed an interest in greenhouse/hydroponic tomatoes which has resulted in a surge in high-value imports from places like the Netherlands, Belgium, and Canada. Fresh-market tomato imports from traditional greenhouse countries accounted for 7 percent of tomato import volume in 1996, compared with 4 percent a year earlier.
- Interest in greenhouse/hydroponic tomatoes has also spurred construction of several large domestic greenhouse facilities catering to the high-end tomato market.

Despite the rocky start to the year with the January Florida freeze, if there are no further weather disruptions, tomato prices at all levels of the marketing chain are expected to average modestly higher with 1997 shipments expected to about match those of 1996. Retail tomato prices averaged $1.21 per pound in 1996--up 5 percent from the previous year. With a strong domestic economy underpinning demand, weather will play a key role in determining supply and price changes in 1997.

Carrots: The success of baby carrots and pre-cut carrot products in the 1990's is reflected in rising per capita use. Average domestic fresh-market carrot production during 1994-96 has grown 24 percent compared with 1987-89. Carrot production is dominated by a few large California shippers, but production also is expanding in other states, including new entrants such as North Dakota. Although accounting for just 7 percent of supply, imports--mostly uncut, standard-sized carrots from Canada and Mexico--have grown 70 percent during the 1990's.

Leaf and romaine lettuce: Reflecting consumer interest in variety in foods as well as nutrition, per capita use of leaf and romaine lettuce has gone up about 70 percent during the 1990's. Production during 1996 was 43 percent higher than the 1990-94 average. Exports (largely to Canada) have also increased. While lettuce shippers have seen sharp increases in the leaf and romaine varieties, market share for the traditional iceberg (head) lettuce has declined. Leaf and romaine now command about 25 percent of the U.S. lettuce market compared with 12 percent in 1990. Output is expected to continue increasing in 1997 but with a glut in the lettuce market, prices may not rise from last year's average.

Bell peppers: As consumer interest in Mexican and Italian cuisine has grown in the 1990's, so has demand for bell (sweet) peppers. Bell peppers are used in sauces, salsas, and even as pizza toppings. Per capita use of bell peppers has averaged 6 pounds during the 1990's, compared with 3.9 pounds in the 80's. U.S. production has doubled since the mid-1980's. Import market share remains near the historical average of around 18 percent of supply. In 1997, production may decline slightly due to low prices in 1996 and the effects of the January Florida freeze.

Onions: Similar to the rise in the bell pepper market, onions have soared with consumer interest in pizza, pasta, and salsa. Also favored for health and nutritional claims, per capita use of onions averaged 16.5 pounds in the 1990's compared with 13.4 pounds in the 80's. For 1997, onion acreage is expected to fall slightly as low prices during 1996/97 season will discourage increased plantings. With consistent domestic demand, onion prices should rise in 1997 and lead to improved grower receipts.

Watermelon: After years of decline, watermelon has again found favor with consumers. A combination of new varieties including seedless varieties and strong industry promotion efforts, pushed watermelon use in 1996 to the highest level since 1958. In 1997, watermelon production is expected to decline slightly due to lower prices a year ago.

Over the coming decade, fresh vegetable and melon output is projected to continue on the slow growth trend exhibited thus far in the 1990's. This slow, steady rate of growth is closer to the long-run growth curve for the industry than the rapid growth trend exhibited during the 1980's.

Processing vegetables

Processing vegetable production (excluding potatoes) is expected to decline in 1997 as increased freezing vegetable output (projected up 4 to 6 percent) is outweighed by reductions in canning output (projected to fall 4 to 6 percent). With higher production outweighing a 6 percent decline in Jan 1 stocks, the supply of vegetables for freezing is expected to be slightly higher in 1997. On the canning side, reduced output and fewer imports (due to lower U.S. wholesale prices) will offset higher stocks and leave total calendar year supply down slightly from a year earlier. With wholesale prices down, canned vegetable exports should rise again in 1997. Domestic use is also expected to rise slightly to 106 pounds per capita.

Tomato processors are expected to contract for a smaller volume this year due to burdensome stocks and the lowest wholesale prices for paste since 1992. If the unusually wet winter continues, planting in California could be delayed as growers wait for fields to dry out. *Sweet corn* is second only to tomatoes in processing market share. In 1997, processors, encouraged by higher wholesale prices, will likely contract for slightly more sweet corn than last year. In early 1997, prices are up from a year ago for both canned and frozen product. Sweet corn stocks are lower than a year ago but are still in the comfortable range.

In 1996, processing vegetable output totaled 17.7 million short tons, down slightly from 1995. Output of vegetables for canning increased 1 percent in 1996 and accounted for 85 percent of all

processing vegetables. Production of vegetables destined for manufacture into frozen products (excluding potatoes) declined 4 percent in 1996.

Retail prices for processed vegetables rose 4 percent in 1996 due mostly to a 5 percent increase in canned vegetable prices. Higher canned prices partly reflected the drought-reduced Midwest crops of 1995. Consumers paid only 2 percent more for frozen vegetables in 1996 as strong crops in the West in 1995 built stocks and provided ample supplies.

Potatoes

Strong domestic and international demand for U.S. potatoes and potato products continues, but high stocks and low grower prices for fresh potatoes should lead to a drop in acreage and production in 1997. The record crop last fall caused grower prices (for all uses) to average 26 percent below year earlier levels for the first 4 months of the marketing season. For fresh potatoes, grower prices averaged 45 percent below a year ago, but contracts with processors have prevented a similar plummet for processing potatoes.

Planted acreage for all seasons is likely to decline 4 to 6 percent from last year. If trend yields are realized, total production for 1997 would range from 450 to 460 million cwt – down around 8 percent from 1996. Consequently, reduced supplies are likely to lift grower prices and crop value for the 1997 potato crop. USDA's first official estimate of planted acreage for fall potatoes will be released in July.

Although grower prices for fresh potatoes have dropped dramatically from last season, retail prices have not declined as steeply. The producer price index for fresh potatoes was down 43 percent from last season in September-December, while the consumer price index was down only 5 percent (see the section on price margins).

Lower grower prices for fresh potatoes and ample supply of processing potatoes will continue to boost exports for much of 1997. However, potato exports will likely slow toward the end of this calendar year as prices rebound with an expected smaller fall crop. For the first quarter of the 1996 marketing season, which began in September of 1996, exports of fresh potatoes were up nearly 46 percent, and fries were up 16 percent. Southeast Asia, Japan, and Hong Kong continue to be expanding outlets for U.S. french fries.

Trade disputes between the United States and Canada continue to be major issues in the industry. Imports of fresh potatoes from eastern Canada into eastern markets in the United States have concerned various U.S. producers for several years. Also, fry imports from Canada have been on a strong upward trend since 1989—a trend which is continuing into 1997. A Canadian processor won a contract in 1996 to supply a major fast food chain in the United States with fries.

Dry Edible Beans

The United States is the fifth leading producer of dry edible beans in the world and U.S. harvested area has been slowly trending upward over the past 15 years. With production down in 1996,

prices for many major bean classes have risen. Average aggregate dry bean grower prices in early 1997 were 16 percent higher than a year earlier with the highest prices for kidney, lima, and small red beans. Higher prices generally signal growers to increase acreage. Thus, dry bean growers will likely increase area planted in 1997. However, with the prices for alternative crops like wheat and soybeans still very attractive, the acreage response for dry beans may be muted. Exports are expected to grow by more than 50 percent over the next decade as Mexico's expanding economy increases import demand and Iraq eventually re-enters the world trade scene.

Fresh-market fruit

Production of both citrus and noncitrus fruit is expected to be higher in 1997. Weather problems afflicting orchards and vineyards this season have generally been less severe than those that damaged crops a year ago. With larger marketings expected this season, grower prices for fruit are likely to decline after rising 21 percent in 1996 because of reduced output of major noncitrus crops. Over the next decade, assuming strengthened domestic and export demand, grower prices are expected to trend upward at a modest rate.

Fruit production is projected to show steady increases through the year 2005. Fruit growers cannot respond immediately to supply and demand factors as vegetable growers do. It takes several years for trees to bear fruit suitable for marketing, and therefore trends are slow to emerge. Weather is the single most important factor affecting fruit production from year to year. While most fruit and nut trees have alternate-bearing production years upon which production forecasts are based, weather can affect production in the immediate season and for years to come. Another issue affecting fruit producers is the reduced population of bees needed for pollination.

Last year, the consumer price index (CPI) for all fresh fruit was at its highest level in the nineties. The CPI for fresh fruit has been increasing steadily since 1994 at an average annual rate of about 7 percent. This upward trend is likely to continue over the next several years, helped in part by banana prices which increase around 5 percent annually. However, the overall growth rate will probably decline as both citrus and noncitrus production increase. Fruit retail prices are forecast to rise an average of 3.5 percent a year through 2005.

<u>*Citrus fruit:*</u> The strongest increase in fresh fruit production is expected to occur in the citrus industry. Trees planted in Florida following the December 1989 freeze are now beginning to mature and bear fruit. While most of Florida's oranges are used for processing, increased production of grapefruit and tangerines will increase Florida's overall fresh-market citrus production. The increase in Florida orange crop may also lead to an increase in the quantity of oranges sold for fresh market, especially navel oranges, temples, and tangelos.

Florida is expecting record crops of both white and red seedless grapefruit. A freeze in Florida at the end of January missed the major grapefruit-growing areas, leaving the crop estimate unchanged. Smaller-sized grapefruit this year, however, has reduced the quantity of fruit available for fresh market and may affect grower prices. California also is expecting a good crop this year. Barring major weather problems, grapefruit production could continue increasing over the foreseeable future. However, much grapefruit may be abandoned or groves uprooted

because production is increasing faster than the ability of markets to absorb it.
The 1996/97 California-Arizona orange crop is forecast slightly lower than last year due to reduced Valencia production. Fruit quality, however, is good, which will help support prices. New tangerine trees were planted in southern Florida in response to tree-damaging freezes in the eighties. Growers planted easier-to-peel varieties of tangerines--Sunburst and Fallglo--in addition to the traditional Robinson, Honey, and Dancy varieties. Tangerine production should continue to increase over the next several years as Florida's per-tree yield increases.

Noncitrus fruit: Total noncitrus fruit production is expected to be up from 1996, but heavy snowstorms in the Midwest and Pacific Northwest plus heavy rains and flooding in California may reduce yields. In localized situations, trees may have been destroyed which could decrease production over the next few years.

For the second consecutive year, noncitrus production fell in 1996. Yields in California were lower for apricots, dates, grapes, kiwifruit, pears, and plums. A winter freeze on the East Coast almost totally destroyed peach production in Georgia and South Carolina, major producers of fresh-market peaches. Fortunately, California's freestone peach production was up in 1996, and its share of the fresh market for peaches went from 28 percent in 1995 to 57 percent in 1996.

The strawberry crop for 1997 has been favorable so far in both California and Florida. Florida growers, who produce most of the early strawberries, were able to protect their crops from the January freeze. In 1996 strawberry production was higher with increased acreage in California.

The varietal makeup in the fresh apple market is shifting away from the dominant Red Delicious apple to new popular varieties such as Gala and Fuji. These new varieties are adding some life to a mature domestic apple market. Per capita consumption of fresh apples has not changed much in the past decade. Use so far during the 1990's is averaging 19.1 pounds per person compared with 18.7 pounds during the 1980's.

Tree nuts: Tree nut production is expected to increase 6 percent by the year 2000. Bearing acres have been increasing for most major tree crops. Pecan production was down in 1996. Drought conditions in Texas and Oklahoma lowered pecan production substantially. Georgia, the leading producer of improved variety pecans, had a good crop with a 29 percent increase. Hazelnut production was lower in 1996 due to the alternate-bearing nature of nut trees. Weather damage lowered yields for walnuts while almond supplies rebounded after falling 50 percent in 1995.

Processing fruits and nuts

The use of fruit for processing is projected to increase during 1997 to 2005 due to increases in both domestic and export demand. With good demand for processed fruit, retail prices are expected to trend upward by about 2 percent annually through 2005. In 1996, retail prices for processed fruits increased 6 percent from a year earlier. Prices rose for orange juice, canned peaches, apple sauce, and wine. The major processed products from fruits are juices and wine, accounting for about 50 percent of 1996 total fruit production.

Total grape production for wine was up in 1996. While the traditional varieties used for wine fell, varieties usually destined to fresh market or raisin production were diverted to wine use to meet the increasing demand for California wine. Strong demand for grapes led to higher prices. Output should stay strong over the coming years as demand for wine continues to increase.

The Clingstone peach is the major peach variety used for canning. Production was up 20 percent in 1996. The 1997 crop should also be large. Flood damage from winter rains in California affected only a small portion of the processing peach variety. Bartlett pear output, used for canning and other processing, was down in Washington, California, and Oregon, the major producers of the variety as a result of cold weather in late 1995 and poor pollination conditions. Production has been declining since 1994 despite steady or slightly increasing bearing acres.

The fruit industry has been working to expand its fresh-cut processing in a manner similar to that of vegetables which are so widely available today. The apple industry is trying to find methods to prolong the shelf life of sliced apples. The citrus industry is working with new technology that would peel and slice oranges and grapefruit so the fresh fruit could be sold pre-sectioned. If products such as these become commercially viable, the additional convenience they offer could help expand demand for apples and citrus.

Fruit juices

Orange juice production will be up in 1996/97 due to Florida's record orange crop. The freeze this January hit major orange-producing counties but caused only minor damage. Orange juice production should be increasing over the next several years as maturing trees come into full production. Grape juice production fell in 1996 mostly because of lower production in Washington and Michigan. Washington grape production, which usually accounts for about half of grape juice production was at its lowest level since 1986 because of a winter freeze.

Consumption Trends and Price Issues

Per capita use of all vegetables, melons, fruits, and tree nuts totaled an estimated 722 pounds in 1995 (fresh-weight basis)--up from 664 pounds in 1990. By 2005, total per capita use of fruits and vegetables is expected to be about 767 pounds. Fresh fruit and vegetable use is expected to move from 298 pounds per person in 1995 to 313 pounds by 2005. However, processing now accounts for a substantial proportion of fruit and vegetable use and is also expected to continue to grow. For example, frozen potatoes accounted for 35 percent of the potato crop, and tomatoes for processing accounted for about 30 percent of all vegetable production (excluding potatoes and pulses). Per capita consumption of processed fruits and vegetables is projected to increase from about 416 pounds (farm-weight equivalent) in 1995 to 445 pounds in 2005. Fresh-cut fruits and vegetables are considered fresh-market produce and are grouped in the fresh category.

Per capita use trends

Vegetables: In 1996, per capita use of vegetables and melons increased due to higher production

which forced prices lower for many major fresh and processed vegetables. For 1997, per capita vegetable use will depend on available supplies, retail prices, and the general economy. Assuming continued steady economic growth, small retail price increases, and normal weather in 1997, per capita use for all vegetables may remain flat as gains in processing vegetables and potatoes offset lower fresh vegetable use. Lower output and higher prices caused by freeze losses in Florida during the winter may result in lower overall fresh vegetable use in 1997.

During the 1997 to 2005 baseline period, per capita consumption of fresh vegetables is projected to increase about 0.5 pounds annually (0.4 percent), which combined with population growth, will raise demand for U.S.-produced fresh vegetables by over 1 percent a year. Fresh imports are expected to continue rising through this period, with import penetration rising from 11 percent in 1996 to 15 percent by 2005. The projected gain in fresh imports exceeds the expected gains in exports during this period.

Fruit and Tree Nuts: Throughout the nineties, demand for fruit products has remained relatively flat. Juice per capita consumption increased about 2.5 percent yearly, the fastest growing sector of the fruit industry. Grape and grapefruit juices showed the greatest average annual growth. Most of the increase in grapefruit consumption coincides with large crops. Total fresh fruit consumption declined during the early nineties with consumption only rising for oranges, lemons, and grapes. Processed fruit per capita consumption has increased an average of 1.4 percent annually since 1990/91. In 1995/96, only grape, strawberry, orange, and lemon consumption increased among the major processed fruits.

Per capita use of fresh noncitrus is expected to show slight increases, while consumption of fresh citrus is projected to decline as we reach the year 2005. Although citrus crops are expected to reach record sizes, large amounts of the fruit will probably be processed into juice, with juice consumption expected to grow. The Florida citrus industry has been stressing the role citrus plays in prevention of heart disease and cancer. How successful the industry promotional campaign will be at expanding consumption will be a good indicator what might be ahead in the future for many fruits as more fruits are being studied for their health benefits. Tree nut per capita consumption is also forecast to increase slightly through the year 2005.

Divergence in Fresh and Processing Prices

Retail prices for fresh fruits and vegetables have risen at a faster pace during the past decade than all food. Between 1986 and 1996, retail prices for fresh fruits and vegetables increased 99 percent, compared with 41 percent for all food items. Strong demand for fresh fruits and vegetables relative to other foods is largely credited for this phenomenon. However, even within the fruit and vegetable industries, fresh prices have risen faster relative to processed.

Since the mid-1980's, retail prices for both fresh fruit and fresh vegetables have diverged from those of processed fruit and vegetables (graph). While the processing sector appears to have continued moving along the same trend line, the fresh sectors established a new steeper trend. There are several reasons for this divergence:

- The fresh fruit and vegetable sectors have experienced strong demand over the past 10 years relative to the processing sectors (fresh per capita use has been rising);
- The perishable nature of fresh vegetables makes them more risky to handle which is reflected in higher market prices (lettuce prices can double overnight given a normal supply gap);
- Along these same lines, geographic concentration of fresh winter vegetables makes them subject to production anomalies, disrupting supplies and raising prices (Florida freezes, California white flies);
- Export demand has been strong for fresh fruits and vegetables which in some cases may be reducing supplies available for domestic consumption, raising prices (e.g., strong apple exports to East Asia);
- The demand for ever increasing quality has resulted in the appearance of higher quality produce selling at higher prices (e.g., hydroponic tomatoes);
- The demand for infinite variety in the supermarket produce aisle has resulted in the addition of hundreds of higher cost items (many imported) in supermarkets (e.g., tropical fruits);
- The demand for convenience has resulted in increased processing of fresh fruits and vegetables with the cost added to the price (e.g., packaged salads, cut melons).

Partly offsetting the higher costs of new and improved produce has been the increasing quality and packaging of fresh produce. These may have resulted in increased efficiency in the marketing channel, helping to keep prices down. For example, new extended shelf-life tomatoes and pre-packaged salads have likely helped to reduced shrinkage in supermarket produce aisles while providing consumers with products containing the characteristics demanded (better taste and more convenience).

Has the Marketing Spread Risen?

Retailers and growers have done occasional battle over the prices charged consumers for produce. In times of oversupply, growers want retail prices to reflect fully the nature of supply in order to move as much product as possible to keep their revenue streams up. Retailers argue that they do move prices down to reflect lower wholesale prices. Unfortunately, the relative percentage changes never match because the grower price is generally only a quarter to a third of the final retail price with the remainder made up of marketing services such as transportation, labor, and store overhead costs.

For example, a supply glut drops the grower price of lettuce 20 percent from 17 cents per pound to 13.6 cents. The initial retail price was 60 cents per pound, a margin which reflects a normal grower price contribution of 28 percent of the retail price. Only the grower price has fallen with the retailers' other marketing costs remaining unchanged. Thus, the retailer properly cuts 3.4 cents from the price of lettuce to fully reflect the decline in the farm price. However, consumers would only see a 6 percent drop in lettuce prices to 56.6 cents per pound. Also, given advance notice of when supplies of an item are expected to be large, retailers will sometimes use the product (in this case lettuce) in their weekly advertisements at special discount prices to help move more product along.

Because of the nature of fresh produce prices, marketing margins can vary widely during the year.

However, they usually average out over the course of a year. After examining annual and seasonal margins for several fresh vegetables, the following was noted;

- Iceberg lettuce, growers received 24.5 percent of the average retail price during 1986-90 compared with 24.9 percent during 1991-95.
- Dry-bulb onions, 35.5 percent during 1986-90 versus 34.9 percent for 1991-95.
- Potatoes, 25.3 percent during 1986-90 versus 20.2 percent for 1991-95.
- Tomatoes, 35.4 percent during 1986-90 versus 29.7 percent for 1991-95.
- Bell peppers, 33.9 percent during 1986-90 versus 33.3 percent for 1991-95.
- Celery, 25.7 percent during 1986-90 versus 26.0 percent for 1991-95.

U.S. Horticultural Trade Situation and Outlook

Trade has become critically important for the U.S. horticulture industry. With demand in many segments of the domestic market maturing, the industry is looking to export markets as avenues for growth. At the same time, U.S. consumers are seeking increased variety in their diets. The industry is turning to imports to find commodities or varieties which are in demand but not available domestically and to fill seasonal supply gaps.

The United States is a net importer of horticultural products with net trade favoring imports by about $2 billion. For vegetables, the United States is a net exporter and is projected to continue as such into the next century. For fruits and tree nuts, the United States traditionally has been a net importer (largely due to bananas) but projections of current trends indicate this may change by the end of the century with fresh and processed fruit trade favoring exports. For the green industry, the United States will remain a net importer into the new millennium. In sum, current trends indicate the value of total U.S. horticultural imports and exports will be closely balanced within the next ten years.

Exports

U.S. exports of horticultural products increased steadily over the past 12 years and are expected to advance another 5 percent in fiscal year 1997 (October 1996 - September 1997). If the forecast is realized, horticultural exports would be $10.5 billion, or 19 percent of total agricultural exports. Twelve years ago, horticultural exports were valued at a little less than $3 billion and accounted for 10 percent of total agricultural exports.

The 1997 forecast is based upon ample availability of U.S. products and various assumptions on market conditions, such as:

- sales to Mexico continue their current pace of recovery,
- exports to Canada benefit from the progressive lowering of duties under the free trade agreement,
- no additional significant appreciation of the dollar against the yen, and
- continued steady growth in key East Asian and Latin American markets.

Three markets--Canada, the European Union, and Japan--accounted for two-thirds of export sales in FY 1996. These markets have grown in recent years, but smaller markets, especially those in East Asia and Latin America, have been more dynamic. These include Hong Kong, Mexico, Taiwan, Korea, Brazil, Singapore, and the Philippines.

U.S. exports of horticultural products face many challenges this year including:

- slow economic growth and a weak yen in Japan,
- the January freeze in Florida which restricted the supplies of winter vegetables for the Canadian market,
- the slow pace of economic recovery in Mexico, and
- the threat of non-tariff trade barriers, especially unjustified phytosanitary restrictions.

Many of these same issues appeared last year and were responsible for a slow down in the pace of export growth. This year's export growth also is pegged to be moderate compared to the torrid 10-percent per year pace of the early 1990's.

Despite these problems, the long run prospects for expanding horticultural product exports are favorable. The Uruguay Round Agreement locks in lower tariffs and provides a framework for challenging other trade restraints. U.S. shippers of fruits and vegetables will benefit from open markets and an emerging middle class in fast growing developing countries. NAFTA will promote growth in North America.

The United States now exports about 8 percent of its fresh vegetable supplies and this is not expected to change appreciably during 1997. On the processing side, about 4 percent of vegetable supplies are exported with 3 percent imported.

Processed exports are projected to continue increasing along with other high-value products. However, the recent strength in domestic demand for noncitrus juices and wine will increase demand for imports. Long run baseline projections assume that U.S. producers will meet any increases in demand for orange and grapefruit juices, processed potatoes, tomatoes, and other canned, frozen, and dehydrated vegetables.

U.S. export volume of fresh fruits was flat in 1996, partly due to higher domestic prices for fresh apples. Fresh fruit exports have increased from about 20 percent of domestic production in 1986 to over 25 percent in 1996. With this trend expected to continue, the United States is projected to be a net exporter of fresh fruits (in terms of value) at the turn of the century.

Imports

U.S. imports of horticultural products are expected to increase 7 percent to $12.5 billion in FY1997. Last year imports jumped 13 percent, in large part because of increased volumes and prices for tomatoes and a big jump in wine. Imports of greenhouse/nursery products (60 percent cut flowers/greens) totaled $1.0 billion last year while exports totaled $218 million. This year,

vegetable imports will remain strong, and wine imports will continue to grow.

In calendar year 1996 the value of fresh vegetable and melon imports rose 17 percent. Most of the increase was concentrated in tender fresh vegetables and melons during January-May. Imports of fresh fruit increased 5 percent in 1996. Most fresh fruit imports are bananas and noncitrus fruit such as grapes, peaches, and pears coming from Chile during the winter and early spring months. Imports of apples rose in 18 percent in 1996.
Imports of Brazilian orange juice increased in response to lower U.S. production and lower availability of FCOJ from Mexico. Imported orange juice is used by U.S. orange juice processors to blend with the domestic product to achieve the desired color and sugar to acid ratio, especially early in the processing season. Also, processors who export FCOJ may receive an import duty "drawback" (refund).

In 1996, two major firms who process orange juice in Brazil bought existing plants in Florida, increasing the Florida presence of companies also operating in Brazil to three. These companies invested in Florida in order to protect their shares of the U.S. orange juice market in the face of expanding Florida orange production.

Per capita consumption of fruit and vegetables, 1980-2005

Item	1980	1985	1990	1995	2000f	2005f
			---pounds----			
Fruit:						
Citrus	123.6	116.0	101.4	117.9	114.0	116.0
Fresh	26.1	21.5	21.4	24.4	25.0	24.0
Processed	97.6	94.5	80.0	93.5	89.0	92.0
Noncitrus	148.0	154.3	158.3	159.2	166.0	173.0
Fresh	60.9	65.1	70.6	73.5	78.0	84.0
Processed	87.1	89.3	87.7	85.7	88.0	89.0
Tree Nuts	1.7	2.4	2.2	2.3	2.4	2.5
Vegetables:						
Fresh	110.4	126.8	138.5	146.7	150.0	153.0
Processed	116.3	116.3	129.5	130.0	135.0	137.0
Potatoes 1/	114.7	122.4	127.6	140.2	153.0	161.8
Fresh	51.1	46.3	45.7	49.2	50.0	49.7
Processed	63.6	76.1	81.9	91.0	100.0	112.1
Dry beans	5.4	7.1	6.6	7.9	8.2	8.6

f=ERS forecast. 1/ 1995 data is preliminary.

U.S. fruit and vegetable trade, value, calendar years, 1990-96

Commodity	1990	1991	1992	1993	1994	1995	1996
			-----$ millions----				
Exports							
Total agricultural exports	39,363	39,204	42,930	42,608	45,703	55,814	60,431
Fruits and preps, excl. juice	2,008	2,143	2,312	2,335	2,598	2,660	2,659
Fresh citrus	566	593	627	629	652	715	701
Fresh noncitrus	921	968	1,056	1,078	1,302	1,258	1,295
Dried fruit	318	337	345	347	365	374	382
Canned fruit	90	116	132	126	122	137	136
Frozen fruit	42	34	41	44	54	56	59
Other processed fruit	71	94	110	111	103	120	112
Fruit juices	351	355	420	430	493	580	580
Wine	120	139	166	166	178	221	302
Nuts and preparations 1/	976	1,020	1,139	1,182	1,285	1,410	1,626
Vegetables and preparations	2,302	2,615	2,872	3,277	3,876	3,889	3,872
Fresh vegetables	696	801	862	943	990	1,017	947
Frozen vegetables	256	246	265	284	339	410	419
Canned vegetables	184	208	244	279	271	306	328
Pulses	354	269	193	215	282	268	265
Other 2/	812	1,091	1,308	1,556	1,993	1,889	1,913
Imports							
Total agricultural imports	22,770	22,719	24,624	24,981	26,818	29,993	33,552
Fruits and preparations	2,167	2,352	2,505	2,459	2,567	2,771	3,104
Fruit, fresh and frozen 3/	1,764	1,903	1,973	1,956	2,058	2,259	2,504
Fruit, prepared and preserved	403	448	532	503	509	512	600
Fruit juice	990	785	808	649	659	631	913
Nuts and preparations	401	426	467	467	500	485	536
Vegetables and preparations	2,266	2,211	2,184	2,450	2,731	3,103	3,471
Vegetables, fresh and frozen	1,204	1,106	1,034	1,347	1,458	1,716	2,024
Vegetables, prepared and preserved	1,062	1,105	1,150	1,103	1,272	1,387	1,447

1/ Includes peanuts. 2/ Includes hops. 3/ Includes bananas and plantains.

Source: USDA, ERS, FATUS.

LIVESTOCK AND POULTRY OUTLOOK

by

James E. Nix [1]
Livestock Analyst
World Agricultural Outlook Board, USDA

The livestock and poultry industries have seen significant changes during the 1990's. One of the areas where change is taking place is in international trade. Beef, pork, broiler and turkey exports have advanced sharply during this decade. Compared with 1990, exports in 1996 were up 85, 280, 296 and 720 percent for beef, pork, broilers and turkeys, respectively. This strong growth in exports has helped boost domestic prices, but at the same time it has made prices more sensitive to developments in a number of foreign countries.

Another change underway is the rapid movement of hogs to larger operations and shifts in the production regions. The hog industry has moved toward more contract operations in recent years and most of these operations are outside the traditional hog producing region. This transition to large operations has not been without problems. It has met with resistance in some areas because some feel that it puts the "family farm" in an untenable position for survival. Also, in most areas large operations are being criticized for pollution of the environment.

The 1990's has also been a period of uncertain feed supplies and wide swings in feed prices. We have seen major floods and major droughts, as well as periods of ideal growing conditions. Both the cattle and hog breeding inventories were already being reduced in 1995 because of poor producer returns in late 1994 and 1995. The sharp rise in feed prices in 1996 exacerbated the situation and contributed to a sharp reduction in breeding inventories during 1996.

In many respects, U.S. livestock and poultry industries are at a crossroads. It is hard to argue against a continued upward movement in broiler production during the next several years. Pork production probably will rise sharply in 1998 after wallowing along this year at about the 1996 level. Sharp drops in beef output are likely next year following the downturn in cattle inventories we are now seeing. Just how well the beef industry reclaims market share following this downturn of the cattle cycle will be a pivotal point for all of these industries as we enter the next century.

Production

Current prospects point to record large total meat production continuing for the next few years. U.S. total meat output in 1996 was up nearly 2 percent from the year-earlier level and about 21 percent above the 1990 level. Meat production in 1997 is expected to increase about 2 percent from 1996's level as larger poultry output more than offsets a slight decline in beef and pork production. The drop in beef output will result from less cow beef as fed beef

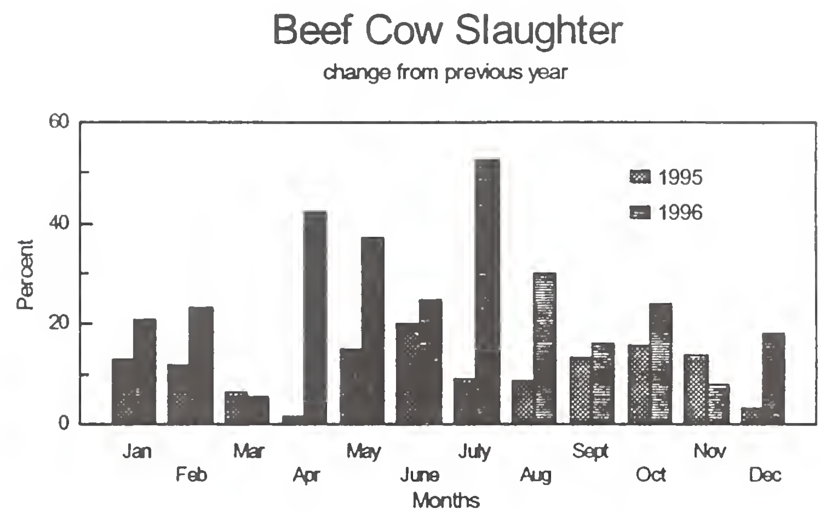
[1] Forecasts presented in this paper are the product of USDA's Meat Animals and Poultry Interagency Commodity Estimates Committees. These forecasts may differ from those in USDA's Baseline forecasts that are also being presented at this Forum. Differences occur because of new data since the Baseline forecasts were prepared.

output will increase. Total meat output in 1998 and 1999 will continue to increase with larger pork and poultry production more than offsetting smaller beef output.

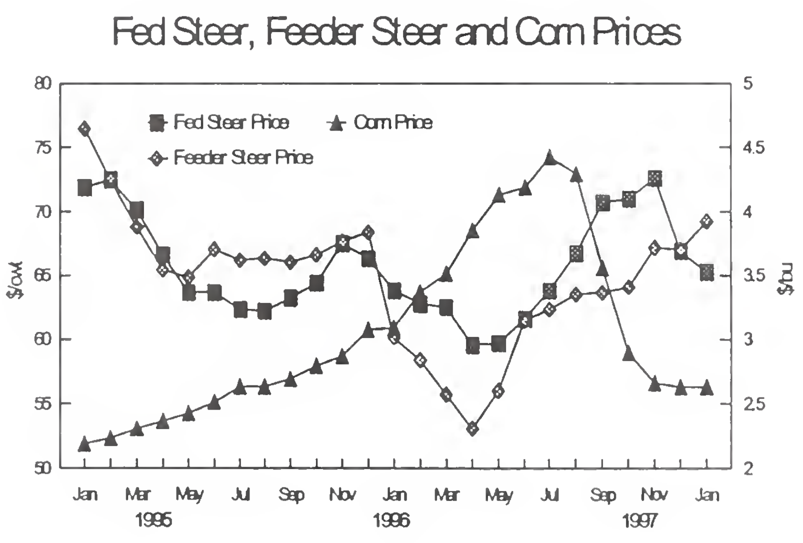
Cattle Inventory On The Way Down

The cattle inventory has peaked for this cycle and is now declining. The U.S. inventory of all cattle and calves totaled about 103.5 million head at the beginning of 1996, up 0.7 percent from the previous year and the largest inventory since 1986. The cow inventory on January 1, 1996 was at about the same level as a year earlier. Producers were trimming herds in 1995 in response to weakening feeder cattle prices and poor returns. Then in 1996, rising feed prices put additional downward pressure on feeder cattle prices, sharply reducing producer returns. Further compounding the hardship, drought hit some of the major cow-producing areas leaving many producers with no option other than to sharply reduce numbers.

Beef cow slaughter rose sharply from the year-earlier level during the spring and for all of 1996 slaughter was up 24 percent from a year earlier. Cow slaughter is expected to stay at relative high levels through this winter then drop below the high levels of a year ago in the spring as new forage supplies develop. For all of 1997, cow slaughter will be down from the 1996 level and a further decline is likely in 1998.



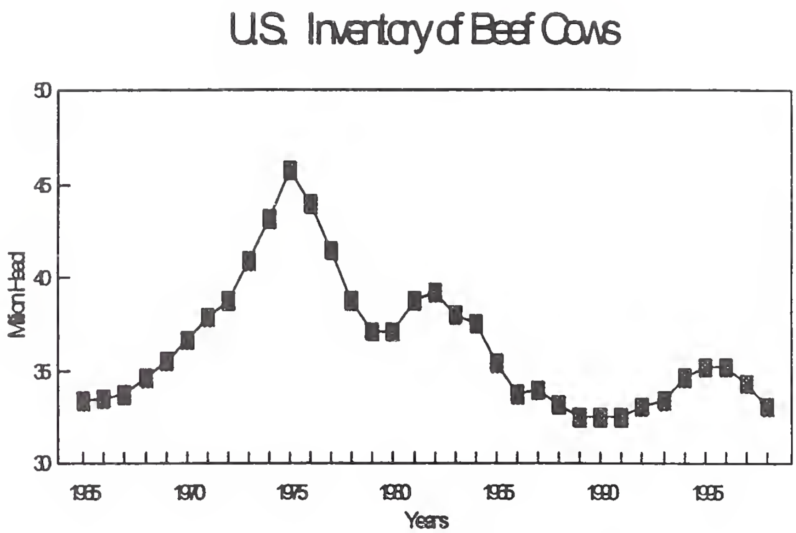
Feeder cattle prices dropped to low levels in the first half of 1996 as fed cattle prices weakened, corn prices shot up, and forage supplies dwindled. Severe drought in some areas pushed feeder cattle prices in local markets to extremely low levels. The recovery in feeder cattle prices in late summer-early fall 1996 lagged the recovery in fed cattle prices. Feeder cattle prices continued to recover in late 1996, and further recovery is expected as we move through 1997, particularly if grazing conditions are favorable and prospects are good for large 1997 corn and hay crops. The January 1, 1997 beef cow inventory of 34.280 million was down 2.7 percent from the year-earlier level. At the beginning of this year, producers were holding 2.1 percent fewer beef

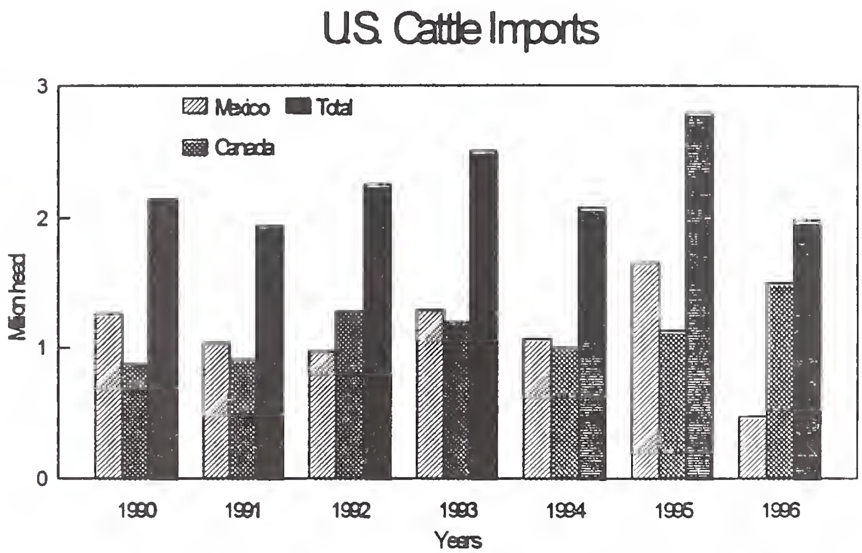


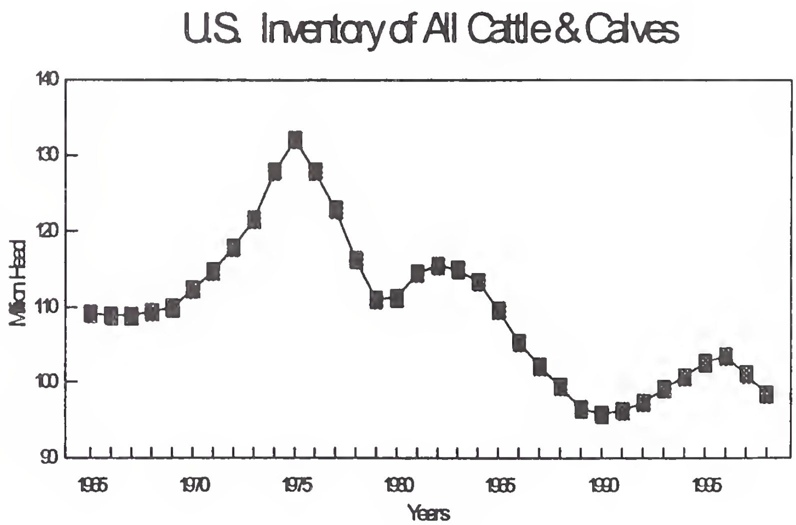
replacement heifers than a year earlier and 6.5 percent fewer than 2 years ago, suggesting further declines in the cow herd. The January 1, 1998 beef cow inventory may be down around 4 percent from the year-earlier level.

The 1996 calf crop of 39.586 million head is down 1.6 percent from the previous year. The reduced January 1, 1997 cow herd and fewer replacement heifers that were being held suggests that the 1997 calf crop will be down from the 1996 level, maybe by 4-6 percent. Improved conditions during 1997 likely will prompt producers to start retaining replacement heifers. However, it will be 1998 before we see much increase in the number of replacement heifers being added to the herd. As more of these heifers begin to calve, it should result in only a small decline in 1998's calf crop from the 1997 crop.

Calf slaughter in 1996 was 24 percent above the 1995 level and cattle slaughter was up 2.6 percent. Cattle imports in 1996 were down nearly 30 percent (more than 800,000 head) from the 1995 level. The reduction was the result of a sharp drop in feeder cattle imports from Mexico. Imports from Canada increased with most of the increase due to fed cattle being shipped to the United States for slaughter. The combination of a smaller calf crop (down 625,000), lower imports (down more than 800,000), and larger slaughter of calves (up 337,000) and cattle (up 936,000) resulted in a 2.2 percent decline in the total cattle and calf inventory on January 1, 1997. This puts us on the downside of the cattle cycle. Cattle slaughter in 1997 will be down a little from the 1996 level, and calf slaughter will drop sharply







from the high level of 1996. But the sharp decline anticipated for the 1997 calf crop will pull the inventory down further. The total cattle and calves inventory will slip lower in 1997 with the January 1, 1998 inventory registering a decline of around 3 percent. The inventory will continue to decline in 1998.

The severe winter storms in the Northern Plains will have an impact on the cattle inventory, but at this time the impact is not known. The impact on the national cattle herd will be minimal, but for local areas the impact may be severe. No doubt death losses will be larger than normal. There may also be an impact on this year's calf crop as well as next year's. Some reports have indicated that cows are aborting calves this winter because of stress and lack of feed. Some cows may fail to conceive this spring and summer and affect the 1998 calf crop.

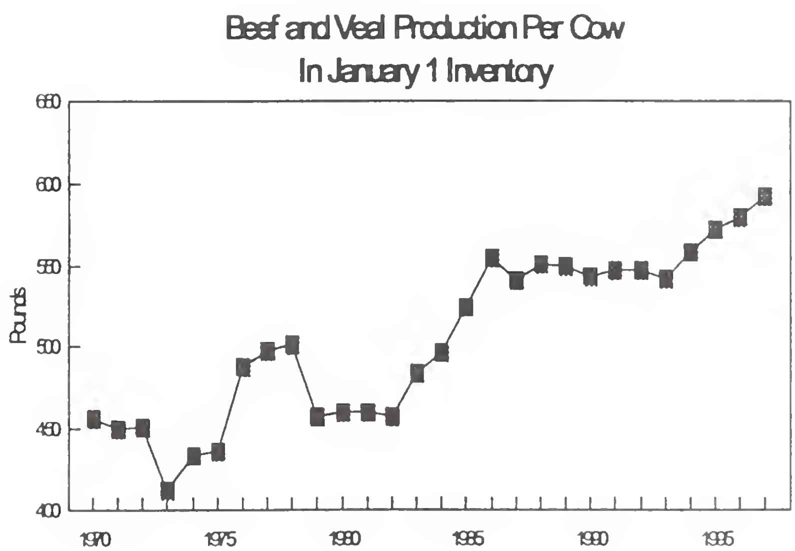
Feeder Cattle Supplies Tighten

Feeder cattle supplies have tightened. Supplies were plentiful this past summer as a result of the sharp decline in feedlot placements in the first half of 1996, but as placements picked up in the summer, supplies started to tighten. The smaller 1996 calf crop, sharply higher calf slaughter, and much smaller feeder cattle imports from Mexico all contributed to the tighter supplies. On January 1, 1997, the supply of feeder cattle outside of feedlots was down 3.6 percent from a year ago.

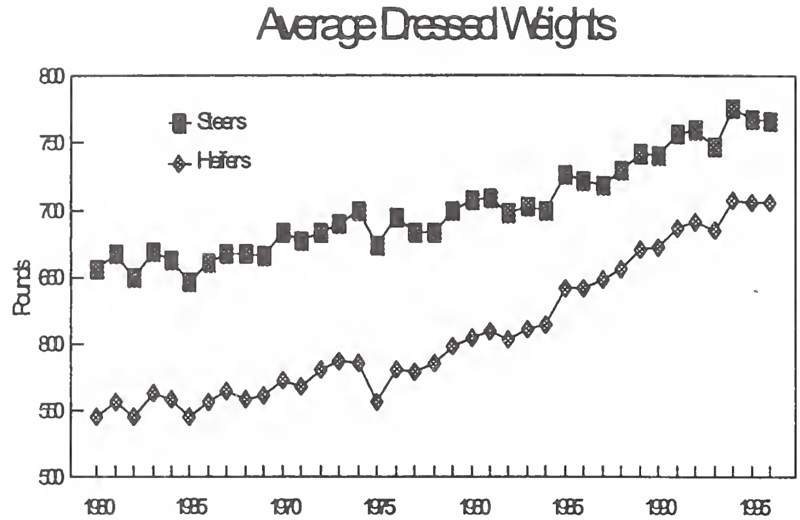
Feeder cattle supplies will tighten further in 1997, primarily because of the smaller calf crop that is expected for 1997. The movement of cattle into feedlots early in the year probably will continue at a relatively rapid rate. In many instances, conditions this winter favor cattle in feedlots over trying to carry them on forages. This will mean that a relatively large share of the steers and heifers will be in feedlots as spring approaches. Another factor limiting feeder cattle supplies in 1997 will be imports from Mexico. The Mexican cattle inventory has been reduced sharply leaving fewer animals available for shipment to the United States than they had in 1995. The financial position of cattle producers in Mexico has improved and they also have better forage supplies than in recent years when they were plagued by drought. Thus, they are likely to keep more of their animals at home rather than export them. The feeder cattle supply will continue to tighten in 1998 as the calf crop slips from the 1997 level.

Beef Production Per Cow Trending Upward

The pounds of beef produced per cow in the inventory at the beginning of the year is trending upward. The long-term trend in the number of cows has been down since the mid 1970's, but the increase in beef produced per cow has helped offset the impact of fewer cows. Several factors figure into this increase in beef produced per cow. The major factor has been an increase in the average weight of cattle slaughtered. Slaughter weight of steers in 1996 was around 100 pounds per animal heavier than they were in 1970. Heifer weights increased even more, rising about 135



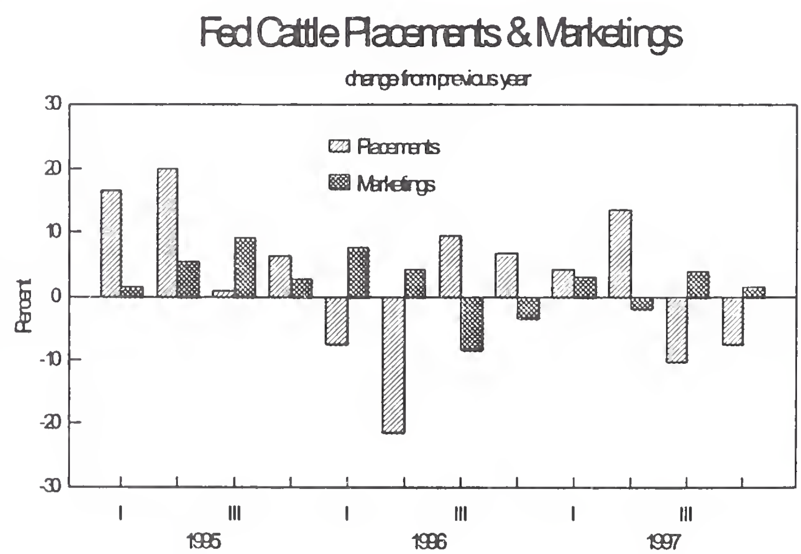
pounds during this period. A shift to heavier breed cattle has been the major factor in this movement to heavier dressed weights.



Another factor contributing to more beef being produced per cow has been a general downward trend in calf slaughter. Instead of slaughtering light weight calves, a higher percent of the animals are now kept on grass and feedlot rations and produce more beef per animal than was the case 10 to 20 years ago. The number of steers and heifers (excluding calves) slaughtered per cow is trending upward. In 1950, the number of steers and heifers slaughtered per cow in inventory at the beginning of the year was only 0.30 head. This rose to 0.58 in 1970, to 0.63 in 1990 and 0.64 last year.

Average weights will probably continue to trend upward for at least the next several years. Changes in the breed composition of the national cattle herd are a rather slow process, so the shift to heavier breeds that has been taking place will continue for some time. Herd rebuilding following the current downturn in cattle numbers will have a major influence on the type of beef cow herd that will be in place for years to come. If a major part of the rebuilding comes from the heavy breeds of cattle, we will continue to see average weights climb well into the next century.

Beef Production Poised For A Decline



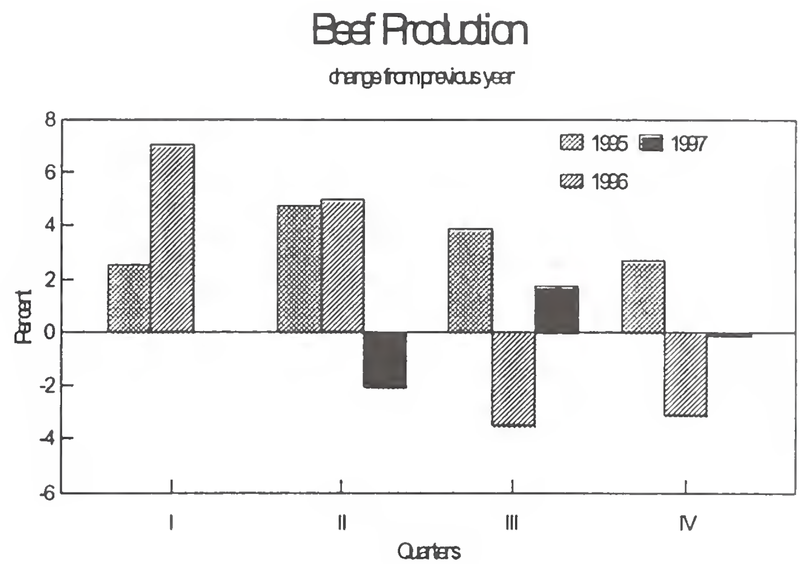
High feed prices and weak fed cattle prices in the first half of 1996 resulted in a sharp reduction in placements of cattle on feed. First quarter placements declined 7 percent, and second quarter placements dropped to almost 22 percent below the year-earlier level. This sharp drop in placements resulted in a decline in fed cattle slaughter during the summer and early fall. The lower fed cattle supplies during the summer reduced beef output and contributed to a recovery in fed cattle prices and improved returns to the cattle feeding enterprise. Movement of cattle into feedlots began to increase with placements in August registering a 20 percent increase. Declining corn prices also contributed to the recovery in cattle feeding. Year-over-year gains in placements occurred through November. December placements were down 2 percent. The number of cattle on feed at the beginning of 1997 was up 3 percent from a year ago. Placements in the

first half of 1997 will be above the low level of a year earlier. Placements in January 1997 were 25 percent above the year-earlier level. However, due to tightening feeder cattle supplies, placements in the second half of the year will decline. Placements in 1998 will continue to be constrained by tight feeder cattle supplies.

Fed cattle marketings have recovered as the large number of cattle that went into feedlots during the last half of 1996 are being sold. Marketings will remain at a high level through the winter. Marketings in the last half of 1997 should exceed the reduced marketings of the last half of 1996, but will be down from the second-half 1995 level. Fed cattle marketings in 1998 will slip from the 1997 level.

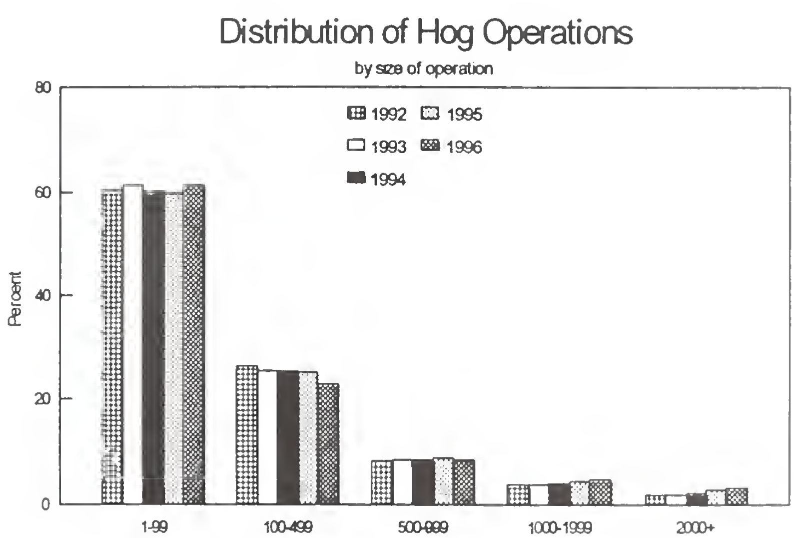
Sharply higher cow slaughter in 1996 boosted beef output. In 1997, cow slaughter will remain at relatively high levels through the winter then drop sharply in the spring. The reduced slaughter in 1997 will help hold down beef production. A further decline in cow slaughter in 1998 will contribute to a drop in beef production, and relatively tight domestic supplies of cow beef.

Beef production in 1996 was up a little over 1 percent from the previous year, but all of the gain came in the first half of the year when output was very large, up 6 percent from the previous year. Second-half 1996 production was down more than 3 percent from a year earlier. Beef production in 1997 is expected to be little changed from the 1996 level, but a higher percentage of the output will come from fed beef as slaughter of feedlot cattle increases and cow slaughter drops sharply. Beef production will decline in 1998 with both fed beef output and cow beef production falling. A 4 to 5 percent drop is likely. Further declines in output are likely in 1999.



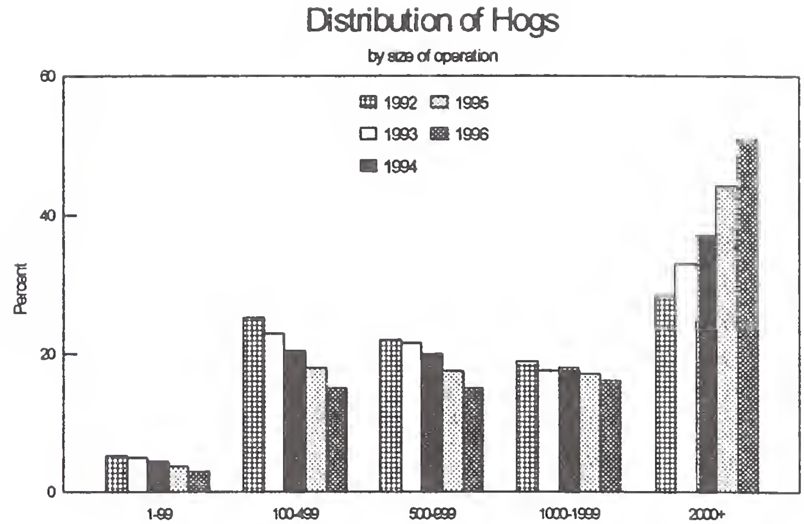
Fewer But Larger Hog Operations To Continue

The number of operations with hogs in the United States has been on a steady downward trend for many years. Based on data from NASS/USDA, in 1996 there were 157,450 operations that had hogs, down 13 percent from the number in 1995 and 41 percent fewer than in 1990. The decline has come in the smaller size operations with the number of large operations

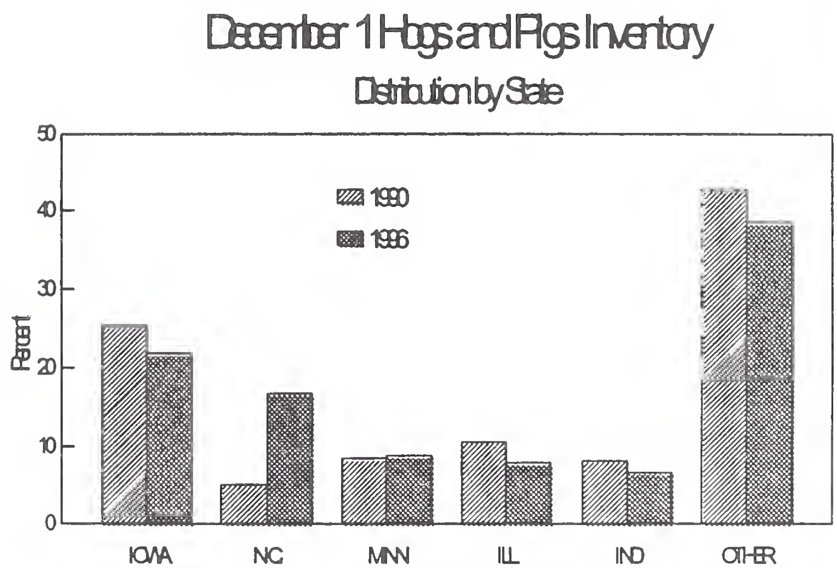


increasing. In 1996, only 4,880 operations had 2,000 or more hogs, 3.1 percent of all operations. At the other end of the scale, 61 percent (96,000 operations) had less than 100 head.

As the number of operations with hogs has declined the average size of operation has increased significantly. In 1996, 51 percent of the hogs were on operations with 2,000 or more hogs compared with 28.5 percent in 1992. The smallest operations, those with less than 100 hogs, held only 3 percent of the inventory in 1996. There does not seem to be anything in the near future that will change the trend to fewer and larger operations.



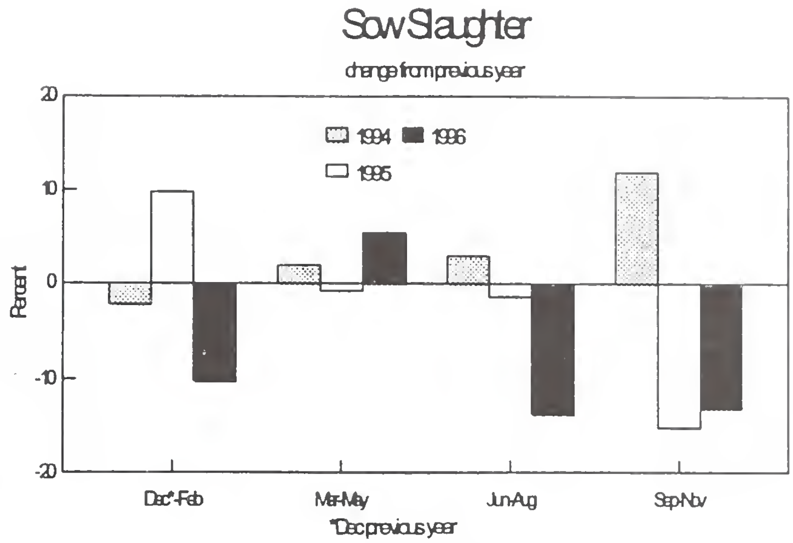
There has also been a shift taking place in the regions of production. On December 1, 1996, the number of hogs in the "traditional hog-producing states in the Corn Belt" were down 9, 2, 8, 6, 17, and 1 percent in Iowa, Minnesota, Illinois, Indiana, Ohio, and Missouri, respectively. States showing increases included North Carolina, Kansas, Oklahoma, Colorado, Wyoming, Utah, and Arizona where inventories increased 13, 18, 32, 9, 12, 163, and 20 percent, respectively. With the exception of North Carolina, the increases for the other states are from a low level compared with the inventories in the Corn Belt states. Nevertheless, it indicates that there is a growing presence of hog production outside the traditional production region. A comparison of the numbers in a few states on December 1, 1990 and December 1, 1996 shows some of these shifts. In 1990, Iowa had 25.4 percent of the inventory, and North Carolina had only 5.1 percent. On December 1, 1996, North Carolina had 16.6 percent of the inventory, and Iowa had 21.7 percent.

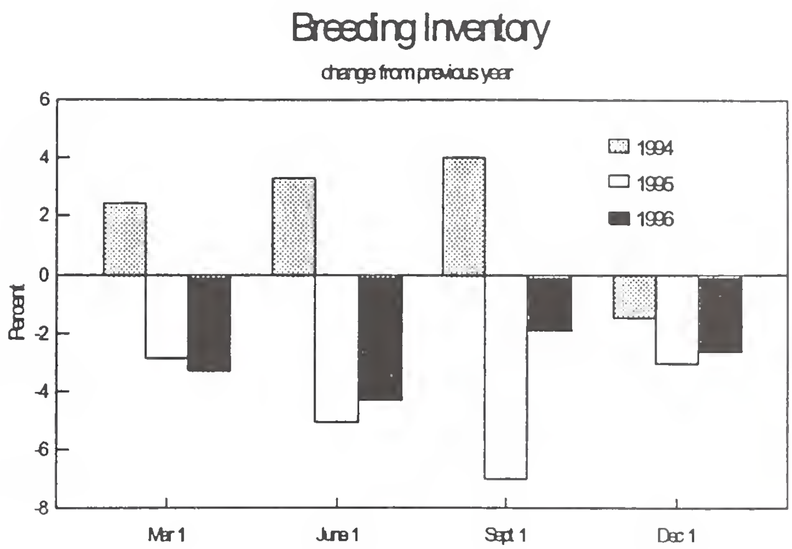


U.S. Inventory of Hogs Kept For Breeding Down

Low hog prices in 1994, particularly the very low prices during the autumn, prompted hog producers to start pulling back on the breeding herd. Sow slaughter during September - November 1994 was up 12 percent from the previous year. Sow slaughter continued at a high level during December 1994 - February 1995, increasing 10 percent from the year-earlier level. Slaughter during March - August 1995 was little changed from the previous year. The June 1, 1995 breeding inventory was down 5 percent from the year-earlier level. The breeding inventory continued to decline, and on September 1, 1995 it was down 7 percent.

Hog prices rebounded strongly in the summer of 1995, but weakened seasonally in the fourth quarter. Adding to the woes of hog producers during this period was rising grain prices that increased as prospects for a poor corn harvest materialized. This further squeezed many producers and they continued to cut back on breeding herds. Sow slaughter during September - November 1995, however, dropped over 15 percent from the high level of a year earlier. Hog prices in 1996 increased and largely offset the high feed costs, providing many producers with returns that at least covered their cash costs. Sow slaughter during December 1995 - February 1996 was down more than 10 percent from a year earlier. Sow slaughter during the spring was up about 5 percent, but in the last half of 1996 it was down more than 13 percent. Sow slaughter as a percent of total hog slaughter was at a record low level during the last half of 1996. It was the large decline in sow slaughter during the last half of 1996 that prompted most analysts to forecast an increase in the December 1, 1996 hog breeding inventory. Producers, however, were not adding gilts to the herd. In fact, during September - November 1996 there was a very sharp reduction in the number of gilts added to the herd. The December 1, 1996 inventory of hogs kept for breeding was down nearly 3 percent from the previous year.

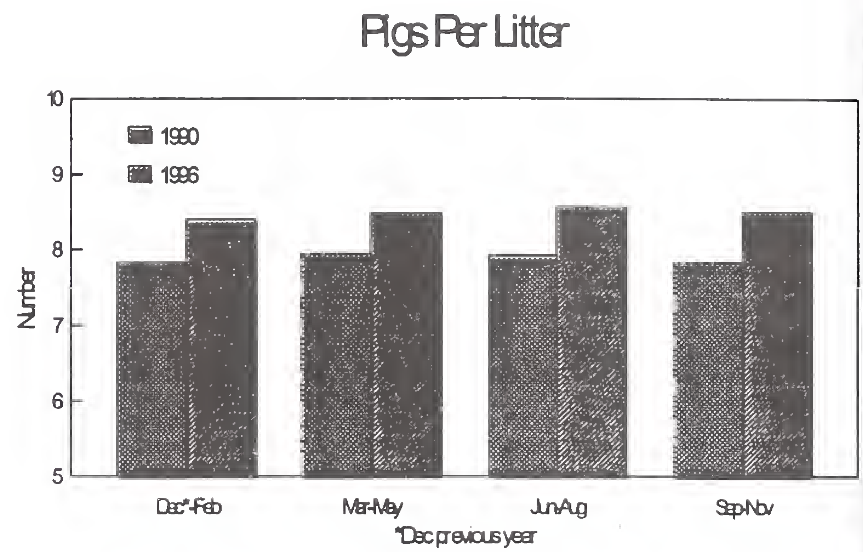




Pigs have already been born, or breeding decisions that will produce pigs for most of the slaughter in 1997 have already been made. At the time the December 1996 *Hogs and Pigs* report was released, only a couple of months remained to breed sows that would produce pigs for slaughter during 1997. Based on data in the December *Hogs and Pigs* report, pork production is expected to stay at levels that will give producers good returns in 1997. A few more sows may be bred than was included in the farrowing intentions, but this would only impact on production late in 1997. The good returns for 1997 should prompt a sharp expansion in the breeding inventory during the year and set the stage for increased sow farrowings in the last half of 1997 and the following year.

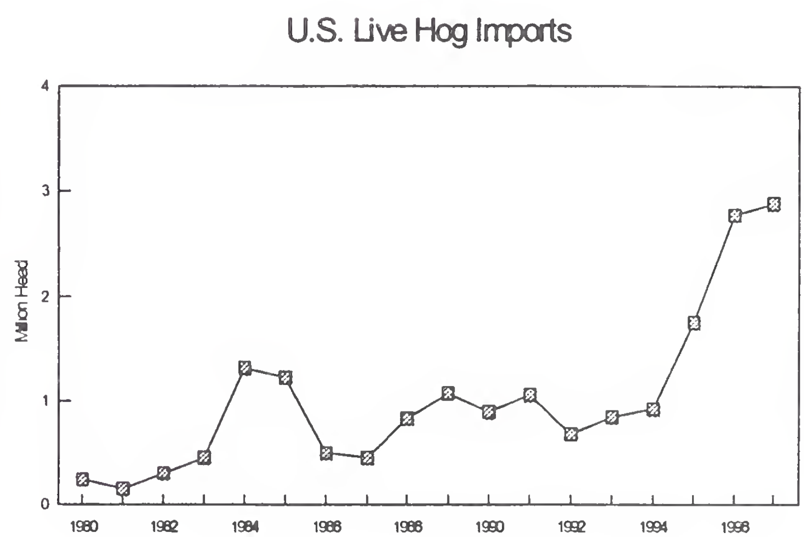
Pigs Per Litter To Continue Increasing

The number of pigs per litter has been increasing, and indications are that this upward trend will continue, at least during the next several years. In 1996, the number of pigs per litter was up about 8 percent from the 1990 level. Helping to push the number of pigs per litter higher has been the larger hog operations. In the December 1996 *Hogs and Pigs* report, the average number of pigs per litter on operations with less than 100 hogs was 7.3 compared with 8.8 for operations with 2,000 or more hogs. The number of pigs per litter on all size operations is probably increasing, but the shift to large operations that save more pigs per litter just amplifies the increase.



Pork Production Poised For An Increase

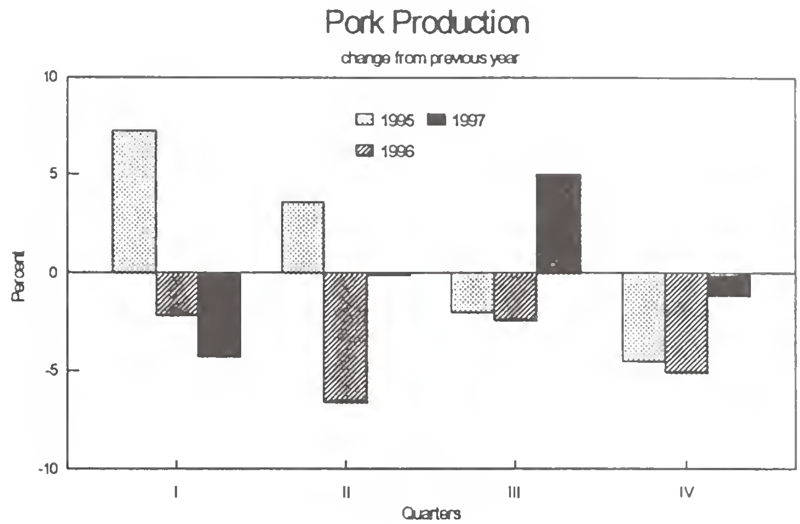
Pork production in 1996 was down about 4 percent from the previous year. Production would have fallen even more had it not been for a sharp increase in the number of hogs imported from Canada.



Data from the December 1996 *Hogs and Pigs* report suggest that output in 1997 will be little changed from the 1996 level. The December 1, 1996 market hog inventory and June through November pig crops suggest that first-half 1997 production will be down about 2 percent. Farrowing intentions and expectations on pigs per litter suggest a somewhat abnormal pattern for second-half 1997 production. The December 1996 - February 1997 farrowing intentions were for farrowings to increase 1 percent from the year-earlier level. This, combined with an increase in pigs per litter, would result in about a 3 percent increase in the pig crop. The December - February pig crop supplies most of the hogs for slaughter in the summer quarter. The last 2 years, July - September hog slaughter as a percent of the December - February pig crop was a little below average. So, with about a 3 percent larger pig crop and a return to a more normal relationship between pig crops and

slaughter, hog slaughter during July - September is forecast to increase over 4 percent. With slightly heavier weights this summer, pork production could increase about 5 percent.

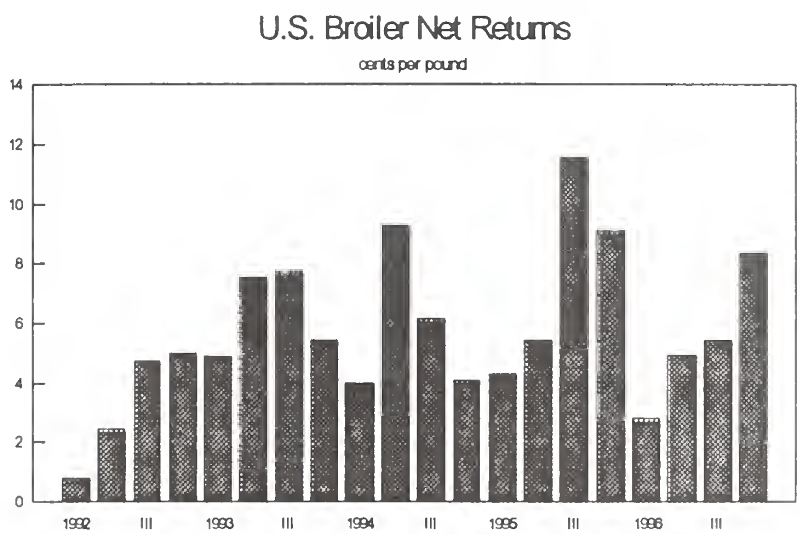
Farrowing intentions for March - May 1996 were for a 2.4 percent decrease from the previous year. After factoring in an increase in pigs per litter, this still leaves us with a smaller March - May pig crop than we had in 1996. Pigs born during this period supply most of the hogs for October - December slaughter. This suggests that slaughter during October - December 1997 will be little changed from the third quarter level and down a little from the previous year. If commercial hog slaughter during October - December 1997 does not increase from the July - September 1997 level, it would be the first time there has not been a seasonal increase in slaughter from the third to the fourth quarters in at least the last 50 years.



The level of pork production indicated here suggests that hog prices should be favorable for producers in 1997. This, combined with feed prices that are down from a year ago, should prompt the recovery in the breeding herd and farrowings previously discussed. Thus, pork production in 1998 is expected to increase substantially, maybe 6 to 8 percent. Increases likely will continue into 1999, but the rate of increase will moderate from the 1998 pace.

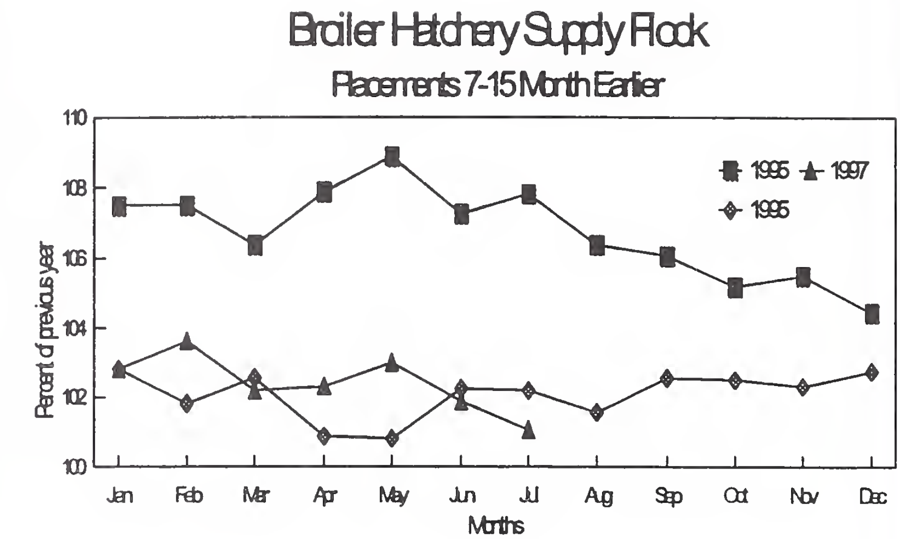
Broiler Producers Had A Year Of Good Net Returns

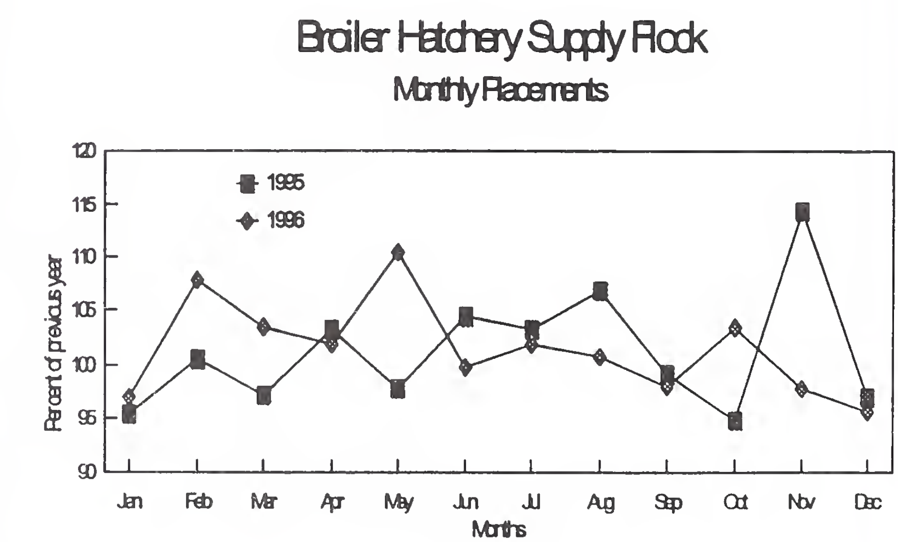
Despite high feed costs, broiler producers had good net returns in 1996. Broiler prices rose to levels that more than offset the higher feed costs during most months of 1996. March was the only month showing a negative return in USDA's costs and returns data. For the year, net returns averaged over 5 cents per pound. With feed costs declining in 1997, returns should remain positive. Costs of production dropped into the low 50 cents per pound range for the first 2 months of 1997, and broiler prices were still above 60 cents per pound in early February.



Broiler Hatchery Supply Flock Expected To Increase

The broiler hatchery supply flock provides a barometer of future broiler production, but this is only a crude indicator. In 1995, the flock was generally up 5 to 8 percent from the previous year, and slaughter for the year was up only a little more than 4 percent. Last year, broiler slaughter increased about 2 percent when the size of the flock fluctuated around 2 percent larger than the previous year. The flock will be up 2-3 percent from a year earlier during the first half of 1997. Monthly placements in 1996 were generally above the 1995 level, but during November and December placements were down from the year-earleir level. With the positive net returns producers saw in 1996 and with feed costs coming down and broiler prices staying favorable in 1997, producers likely will step up the number of pullets being added to the hatchery supply flock from the late 1996 levels. This probably will result in the hatchery supply flock showing a larger year-over-year increase in the second half of 1997.





If the flock grows as expected, it will place the industry in a strong position to increase production in 1998 when beef supplies are expected to decline sharply. Competition from pork will be stronger in 1998, but the tighter beef supplies enhances the probability that the industry likely will expand output.

Continued Increases In Broiler Production Likely

Broiler production increases of at least 5 percent have become the norm. Helping to support these increases is heavier weight birds. In 1996, average weights were up 9.2 percent from 1990's level and were 20.8 percent heavier than in 1980 and 31.0 percent above the 1970 level. In 1996 when feed supplies were very tight and costs high, production increased over 5 percent. A little over half of last year's increase was due to heavier weights.

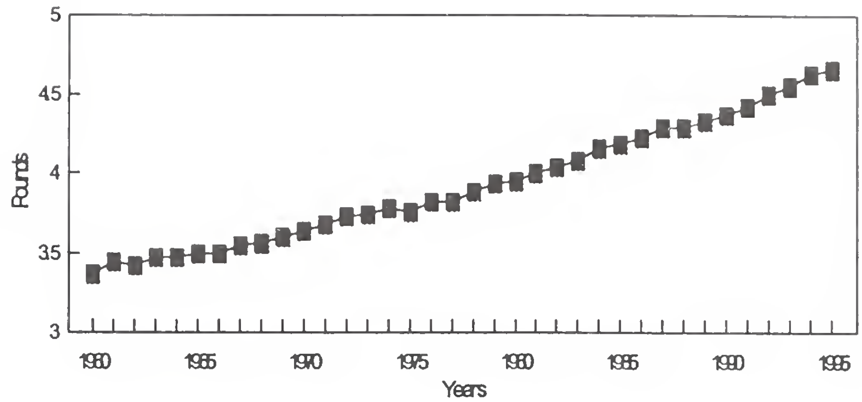
Hatchery data suggests that the increase in production during the early months of 1997 will be a little below the 5 percent mark. However, it is expected that production will begin to expand at a faster rate during the spring as the industry better utilizes the hatchery supply flock. The positive returns that producers continued to enjoy going into 1997 will prompt them to increase output, particularly as we move into the cookout season when demand normally increases seasonally. For all of 1997, production is forecast to increase around 6 percent.

At this point, prospects point to another strong increase in production in 1998. Pork production will be up, but the tighter beef supplies anticipated for 1998 bode well for increased broiler output. By 1999, pork production will have expanded to the point where it will offer strong competition for broilers. The increase in broiler output in 1999 probably will slow from the 1998 increase, but another drop in beef output should make it a relatively favorable year for broiler producers.

Poor Net Returns To Turkey Producers

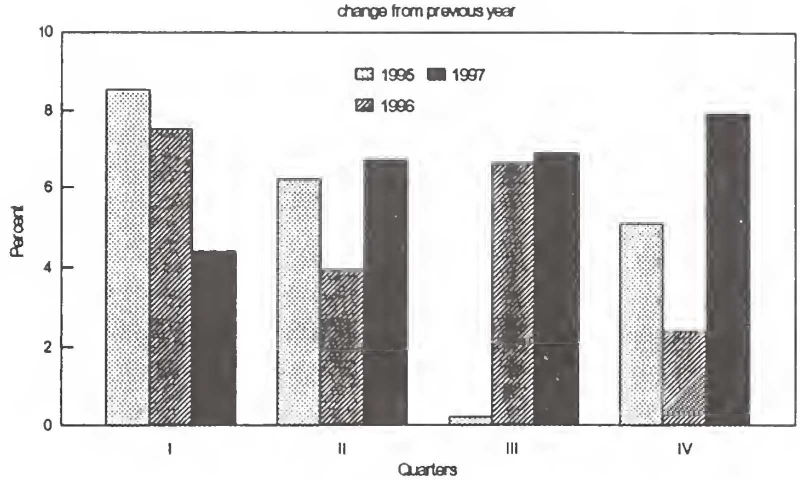
Turkey producers suffered a year of poor net returns in 1996 as feed costs increased sharply and turkey prices averaged near the year-earlier level. Returns were negative every month in 1996 with an annual loss of 6 cents per pound. Feed costs have declined, and in 1997 they are expected to average sharply below the 1996 level. Turkey prices should be up from the 1996 level, particularly in the last half of the year. This is expected to result in positive producer returns for 1997.

Broiler Average Liveweight At Slaughter



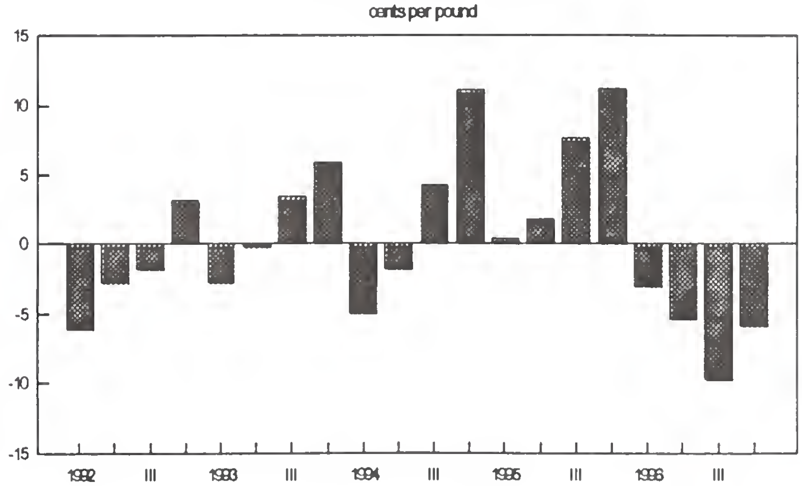
Broiler Production

change from previous year



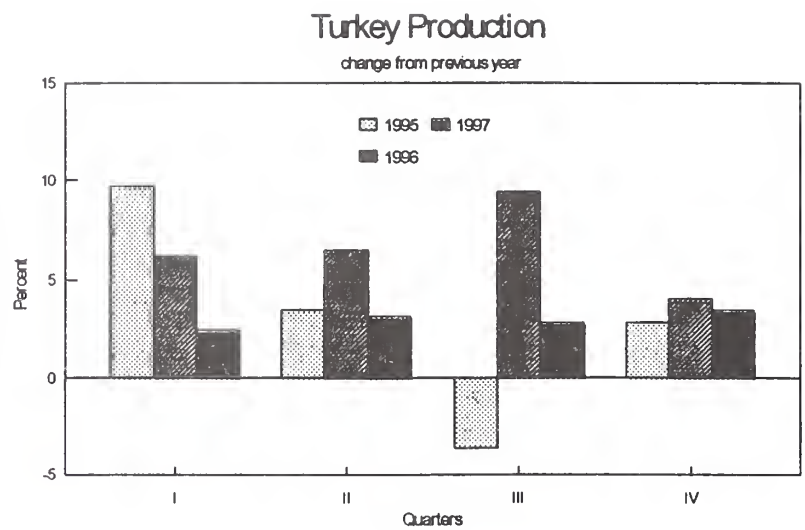
U.S. Turkey Net Returns

cents per pound



Turkey Production Forecast To Increase

Turkey production is expected to increase about 3 percent in 1997 following about a 6.5 percent rise in 1996. The substantial increase in production last year, the largest annual increase since 1990, helped hold turkey prices down even though broiler and hog prices increased. The poor returns that producers encountered in 1996 will hold down the increase in output this year. Improved returns in 1997 probably will result in increased output in 1998. But, expected sharp increases in pork output and lower pork prices likely will hold increases in turkey production to the 2-3 percent range. Competition will be even more intense in 1999, and the rise in turkey output likely will slow to 1 to 2 percent.

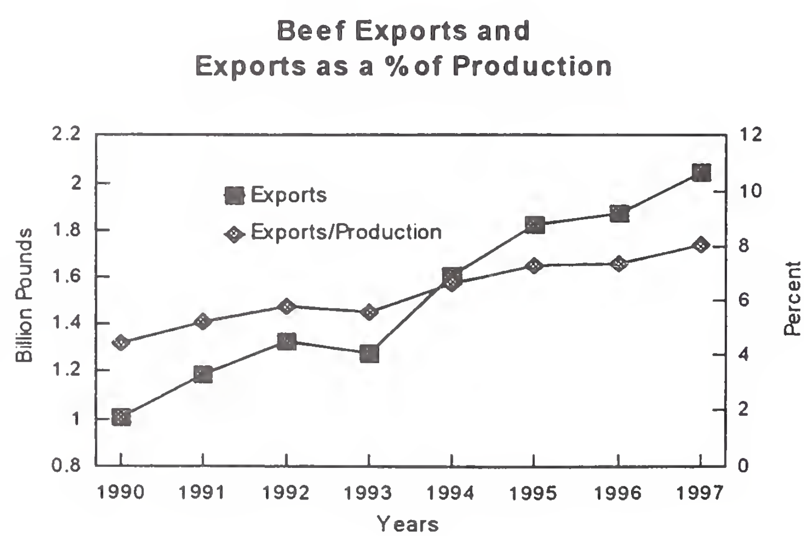


TRADE

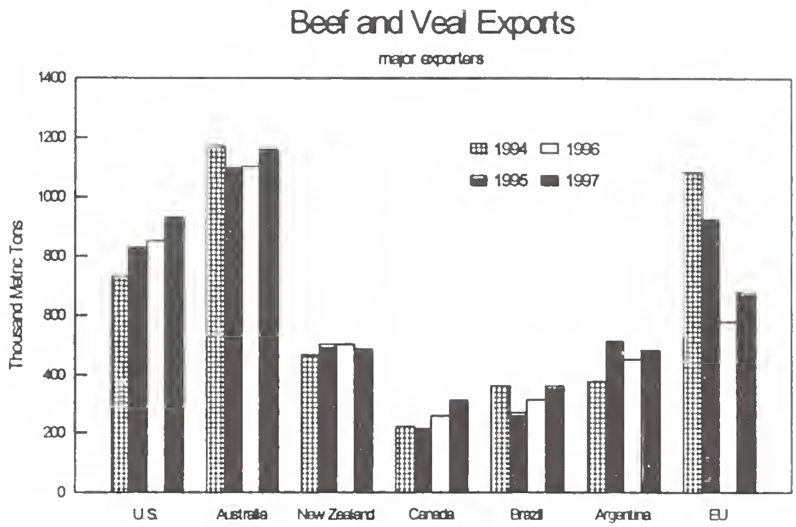
During the 1990's, livestock and poultry industries have made major moves into the international market, and prices have become sensitive to changes in foreign markets. Not only must these industries be concerned with production and demand in other countries, they must also follow developments that might result in trade interruptions. In most cases, a few countries dominate the market for our exports or sources for our imports. On the other hand, U.S. industries must be concerned with providing safe and wholesome products.

Continued Growth In Beef Exports Expected

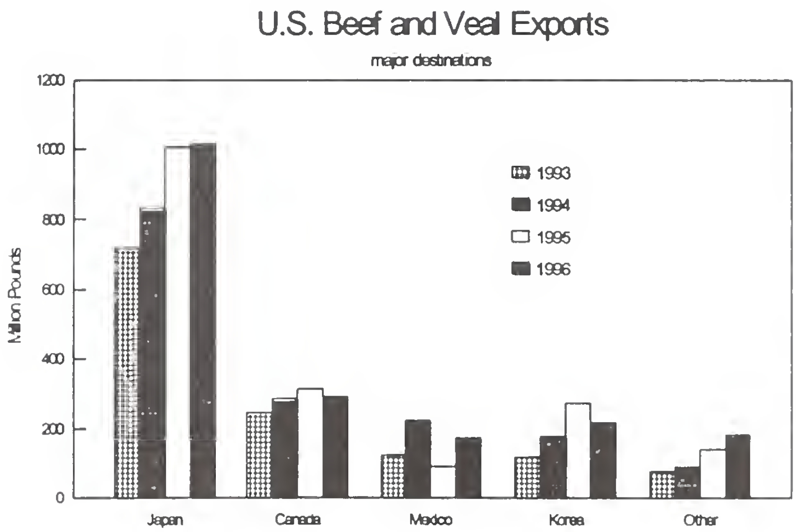
The United States is the premier supplier of high quality beef on the world market, and U.S. beef exports have been on a strong upward trend. Exports in 1996 were up 86 percent from 1990. A larger percentage of the production is also going into the export market. In 1996, exports were equal to about 7.4 percent of production compared with 4.4 percent in 1990. The export market is siphoning off more of the highest



quality beef produced in the United States. As beef production declines the next few years, the percentage of beef going into foreign markets will increase even faster if export demand continues to grow as expected.



U.S. beef exports weakened in the second half of 1996 after posting strong increases in the first half of the year and in 1995. First-half exports were more than 20 percent above the year-earlier level and second-half exports dropped about 12 percent below the 1995 level. Exports remained weak as we moved into 1997, but a recovery is forecast later in the year. For all of 1997, beef exports are expected to increase nearly 10 percent from the 1996 level. Growth in demand for high quality beef in the major importing countries of the world, particularly the biggest customers for U.S. beef, are expected to support the continued climb in beef exports. The United States is second only to Australia in terms of total beef exports, but Australia is not a large producer of high quality grain-fed beef. Other major exporters also do not produce and/or export large quantities of high quality grain-fed beef.



In 1996, two major developments slowed international beef trade and hurt U.S. beef exports. First, the "Mad Cow" (BSE) outbreak in Europe resulted in a worldwide consumer concern about the safety of beef. This concern most likely slowed beef trade and caused problems for traders in many countries that further compounded problems with beef trade. The second major development was the outbreak of E. coli in Japan. The E. coli was not traced to imported beef, but it did have an impact on beef consumption in Japan. For the United States, the impact of these two developments was strongly felt in Japan where consumers cutback on beef purchases. Japan is the largest market for U.S. beef exports, taking about 55 percent of beef exports in 1996. U.S. beef exports to Japan slowed as consumers reacted to the concern over BSE and E. coli. Beef exports to Japan during the first half of 1996 increased 28 percent from the year-earlier level, but in the second half of the year they were down 9 percent.

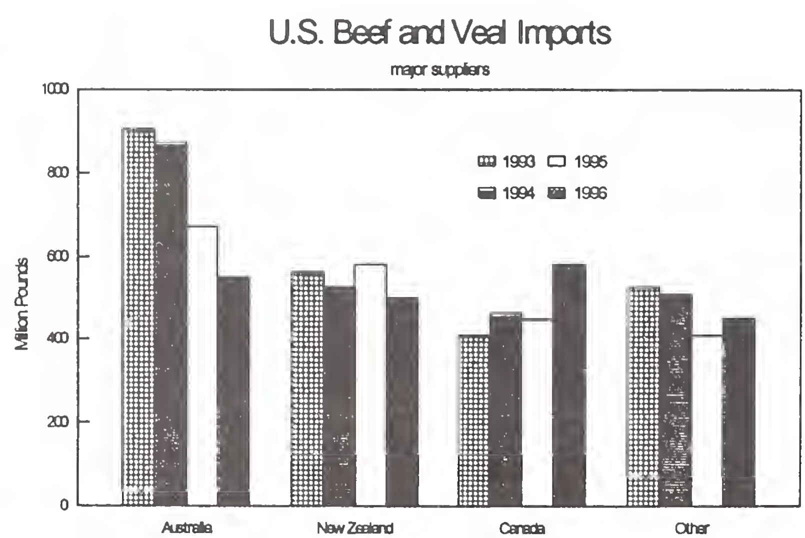
Much work has been done in Japan to assure consumers of beef's safety. Expectations are that the adverse reaction to these two concerns will moderate and beef imports will begin to recover. However, another factor has emerged that is hurting beef exports to Japan. The decline in the yen relative to the U.S. dollar has made U.S. beef more expensive and slowed exports. While current beef prices on the U.S. market are down from late 1996 levels, the price for Japanese importers has not been as attractive. If the dollar stays strong relative to the yen this year as now seems likely, rising beef prices this year will make U.S. beef for Japanese importers much more expensive than in 1996.

Per capita beef consumption in Korea has been increasing at a fast pace. Estimated per capita consumption in 1996 was about 43 percent above the level just 5 years earlier. Supported by strong demand and market liberalization, beef imports have been increasing. U.S. exports to Korea were climbing, but last year they slipped about 20 percent from the high 1995 level. Exports in 1996 were still nearly a fourth above the 1994 level. Growth in demand in 1997 is expected to out pace an increase in production supporting larger beef imports. This should result in a continued good market for U.S. beef.

Mexico's economy is recovering from the very poor performance of 1995 following the devaluation of the peso in late 1994. The rebound in the economy is helping to support a recovery in U.S. beef exports to Mexico. Cattle herds in Mexico have been reduced by the poor economy and drought conditions that cut sharply into feed supplies. This is holding down domestic beef supplies and imports are increasing to supplement consumption. U.S. beef exports to Mexico rebounded in 1996, but they were still below the 1994 level. A further rise in exports to Mexico is expected in 1997.

U.S. beef exports to Canada, another of our major markets, were off in 1996. Beef production in Canada is showing strong increases, up around 10 percent in 1996, and another large increase is anticipated for 1997. Canada's total beef imports were down in 1996, and they probably will slip further in 1997. U.S. exports to Canada are also expected to be lower in 1997.

U.S. Beef Imports Likely To Increase



During the last few years, U.S. beef imports have declined. From 1990 through 1994, imports held around the 2.4 billion pounds level. Imports in 1995 were down 11 percent from the previous year and last year declined slightly. Declining U.S. cow beef supplies and weakness in the Japanese market likely will result in larger supplies entering the U.S. market in 1997.

The United States is primarily an importer of manufacturing grade and canned beef. In 1996, there were large supplies of this type of beef on world markets looking for a home. The weakness in the Japanese market caused by the BSE and E. coli concerns exacerbated the situation as Japan reduced its imports. Even though the United States had large domestic supplies of

manufacturing grade beef from the high level of cow slaughter and feedlot cattle that did not make the higher quality grades, the U.S. market was still the most attractive market available for many exporters. This helped hold U.S. beef imports at a relatively strong pace in 1996, thus the very small decline in imports last year.

Large supplies of manufacturing grade and canned beef are expected to be available on world markets again in 1997. Beef production in the world's largest beef exporter, Australia, is expected to increase in 1997. They will once again be looking for a home for their large exportable supplies. A recovery in the Japanese market will help Australia's export situation, but the recovery is not likely to be enough to keep larger supplies from being pushed into the relatively attractive U.S. market. These larger supplies will enter the U.S. market even as Australia ships more product to other markets it has been trying to develop.

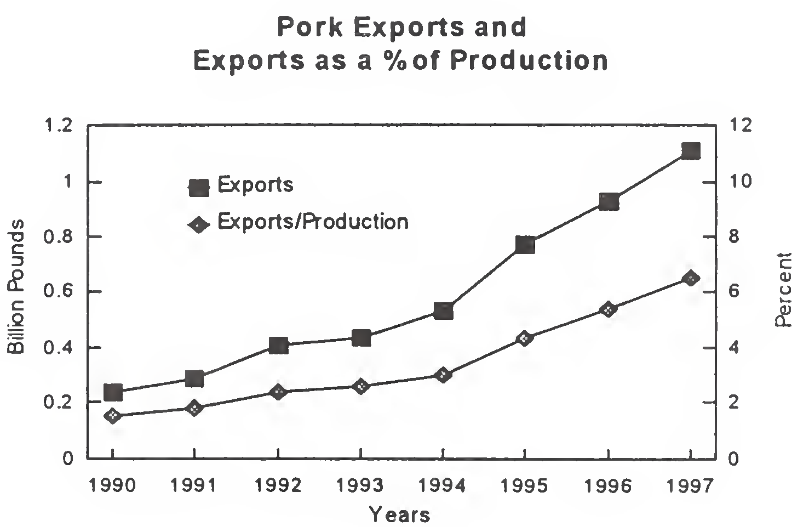
Beef production in New Zealand, another major exporter of beef to the United States, is expected to decline in 1997. New Zealand's total beef exports in 1997 are forecast to slip from the 1996 level with the quantity shipped to the United States also expected to decline.

U.S. beef imports from Canada in 1996 were up from the previous year. Large increases in beef output in Canada have pushed their exportable supplies higher. This will be the case again in 1997 and shipments to the United States are likely to increase.

Beef production in Argentina decreased in 1996 while output in Brazil rose. This is likely to be the situation again in 1997. Neither of these countries can ship fresh or frozen beef to the United States because of past and/or present presence of foot and mouth disease. They can, however, ship canned beef to the United States. Both of these countries saw their total beef exports increase in 1996. Brazil shipped more beef to the United States than it did in 1995 while Argentina shipped less. Both of these countries are expected to increase their total beef exports in 1997, and the United States likely will be the recipient of a normal share of total exports. Argentina is pushing for recognition as a "clean market" (free of foot and mouth disease). If Argentina gets this recognition, it could change the trade picture for beef.

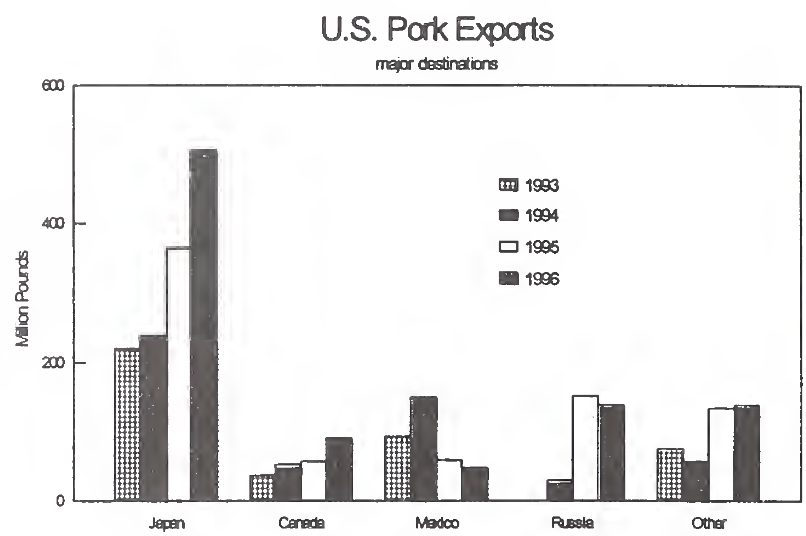
Strong Growth In Pork Exports To Continue

U.S. pork exports in 1996 were up about 20 percent from the previous year and 288 percent above the 1990 level. Another large increase in exports is forecast for 1997 with most of the increase occurring in the second half of the year. A larger share of U.S. pork moves into the export market each year. In 1996, pork exports were equal to about 5.4 percent of production, up from 1.6 percent in 1990. This year, exports may be equal to around 6.5 percent of production.



Japan is the major foreign customer for U.S. pork, taking about 55 percent of 1996's total pork exports. The

concern over the safety of beef probably helped boost pork sales in 1996. For the last several years, Japan has taken around one half of U.S. pork exports. Exports to Japan have also shown strong increases during the last several years, up nearly 40 percent last year. The WTO - sanctioned Safeguard (SG) mechanism that Japan uses to regulate pork imports has caused a large variation in monthly shipments of pork to Japan. Japan imposed the SG on July 1, 1996 and it probably will not be lifted this year until the beginning of July, three months later than our expectations a few months ago. Furthermore, it is likely that the SG will be imposed again this autumn. Pork production in Japan continues to slip, and Japan looks to imports to maintain their level of consumption. Per capita pork consumption on an annual basis has shown little change during the last several years. Exports to Japan are expected to increase in 1997, but the weaker yen will hold down the growth.



Russia has emerged as the second largest market for U.S. pork exports during the last couple of years. Last year about 15 percent of U.S. pork exports went to Russia. In the early 1990's, there were virtually no exports to Russia. The sharp drop in Russia's pork production in recent years has made this a good market for our exports. U.S. export assistance in 1994-95 helped kick start these exports. In 1996, pork production in Russia was only about 50 percent of the 1990 level. A further decline in production is forecast for 1997. Even with large increases in imports, per capita pork consumption in Russia is falling.

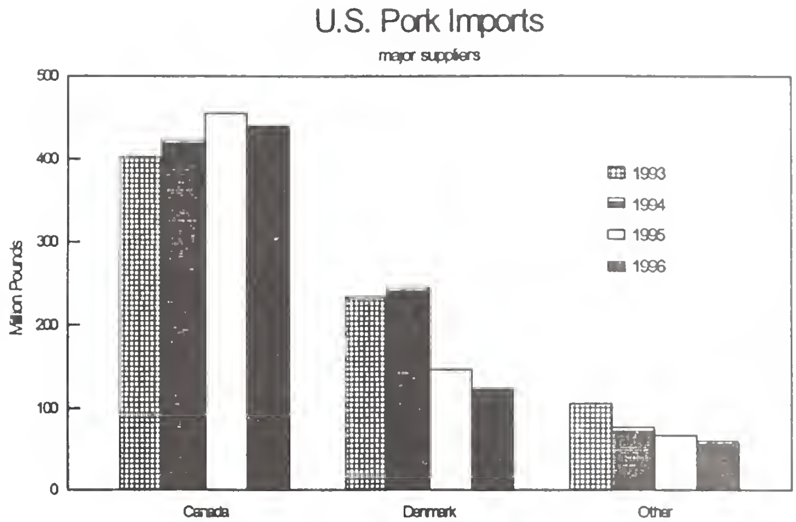
Canada and Mexico are traditional markets for U.S. pork, but they are much smaller markets than Japan and Russia. Exports to Canada have been on a general upward trend, but they account for less than 10 percent of total exports. Annual levels of shipments to Mexico have shown a lot of variability the last several years. They were increasing prior to the peso devaluation in late 1994, and declined sharply in 1995. They were off again last year, but they are expected to increase this year as the economic recovery helps boost demand.

Korea is another emerging market for U.S. pork. From a very low base, exports to Korea have been trending upward. Growing demand for pork in Korea is pushing imports higher even as domestic production holds at high levels. Trade liberalization is expected to result in a sharp jump in U.S. exports to Korea in 1997. This year, shipments to Korea could exceed those to either Mexico or Canada.

U.S. Pork Imports Slipping And Live Hog Imports Increasing

U.S. pork imports have been on a general downward trend for several years. In 1996, imports fell about 6.5 percent from the year-earlier level. A further decline is expected in 1997. Longer term, a slow downward trend in pork imports is expected. Canada and Denmark are the primary sources of our imported pork. Imports from Denmark have been declining sharply and these imports are accounting for a much smaller share of the total than a few years ago. In 1994, imports from Denmark accounted for about a third of total pork imports, but last year they made up

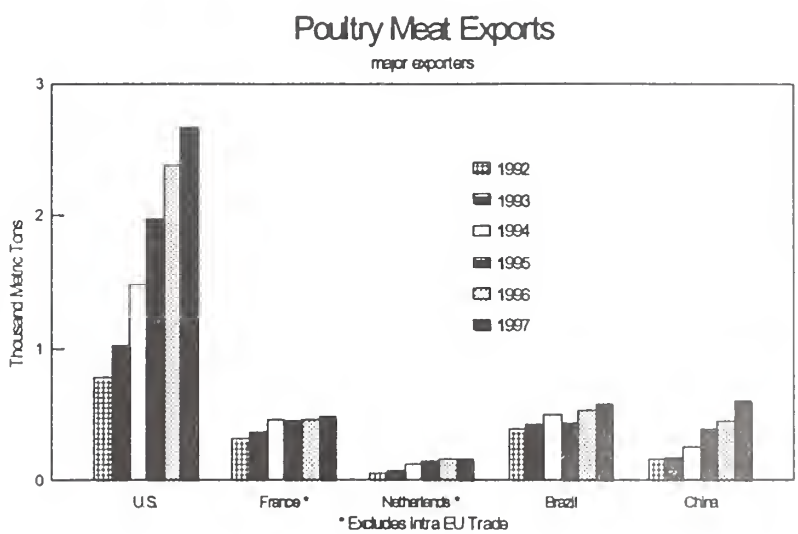
less than 20 percent. Canada, however, continues to ship large quantities to the United States. In 1996, over 70 percent of total pork imports came from Canada.



Live hog imports, virtually all of which come from Canada, have been increasing, and prospects point to another increase this year. In 1996, live hog imports totaled about 2.8 million head, an increase of nearly 60 percent from the 1995 level. Tight hog supplies in the United States during 1996, particularly on a regional basis, prompted this big increase in imports. Most of the hogs imported go directly to slaughter. In 1996, only about a fourth of the imports weighed less than 110 pounds. This year, prospects point to a continued tightness in the supply of hogs in these regions and live hog imports probably will increase again.

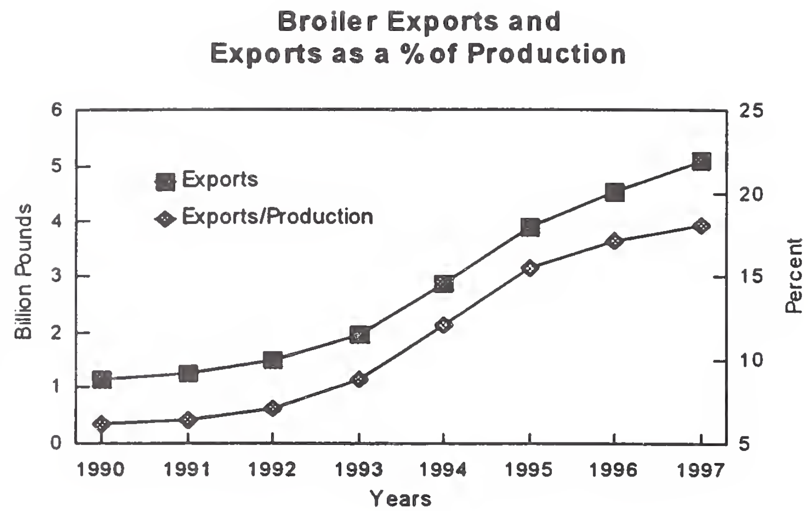
Surge In Poultry Meat Exports To Continue

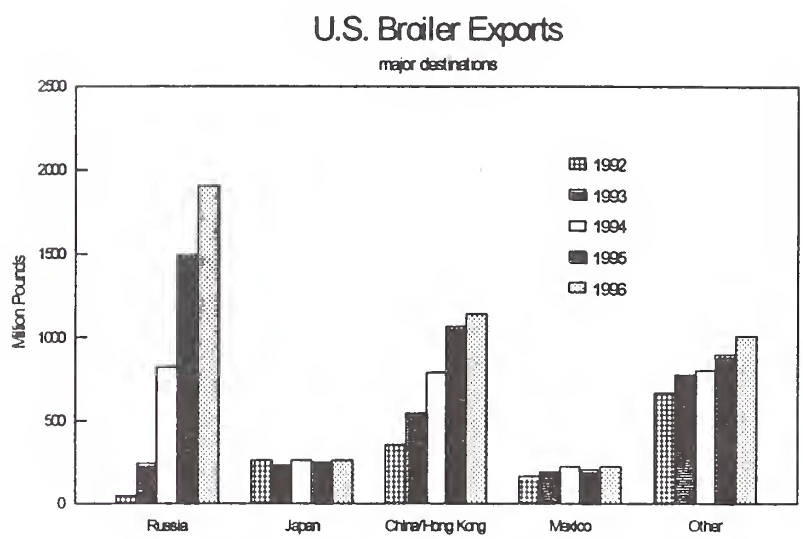
The United States is the world's largest exporter of poultry meat. During the 1990-92 period, U.S. exports were not much larger than those of a few other countries. But, the strong growth in U.S. exports during the 1990's propelled the United States far out in front of competitors. The EU countries offered large subsidies on their poultry meat exports, but they have had to cut back on these subsidies under the WTO rules. This will limit growth in exports by EU countries. (Data in the chart exclude intra EU trade for France and Netherlands). Brazil and China, however, are sharply expanding exports.



U.S. broiler exports have been on a strong upward swing. Exports are largely dark meat products, lower priced parts of the bird with a weaker preference than breast meat among domestic consumers. Exports in 1996 were up 16 percent from a year earlier and nearly 300 percent above the 1990 level. Exports are projected to increase again in 1997 and long-term prospects point to continued increases. In 1996, exports were equal to over 17 percent of domestic production compared with around 6 percent in 1990.

In the 1980's, Japan was the primary market for U.S. broiler exports. Hong Kong/China (a large share of the imports by Hong Kong are transhipped to China) was emerging as a larger market and surpassed the volume going to Japan in the early 1990's. Then in 1994, exports to Russia soared and became the number one foreign market for U.S. broilers. Russia continues to be the largest market and in 1996 about 42 percent of the total broiler exports went to Russia. Broiler production in Russia has been declining and another decline in production is likely this year. In fact, it will be at least a few more years before any significant increase in broiler production in Russia can be expected. However, the U.S. broiler industry proposes to invest several million dollars in Russia to modernize a model complex to provide an example of how companies in the United States produce broilers. Exports to Russia are primarily leg quarters, a relatively inexpensive source of protein for them, and U.S. supplies are expected to remain plentiful. This combination should result in continued high levels of exports to Russia the next few years. But, a lot of uncertainty about the size of this market remains because of the potential imposition of food quotas.

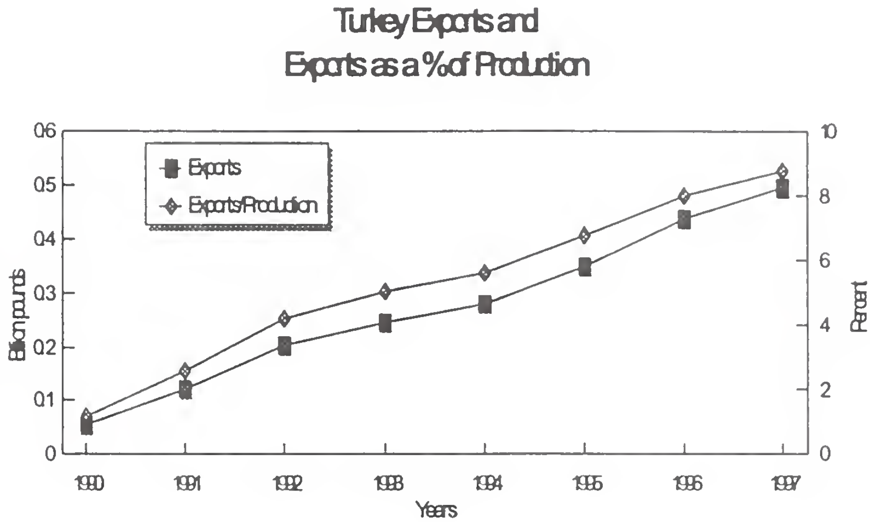




Strong growth in demand in Hong Kong/China is expected to support further increases in exports to them. Broiler production in China has been on a strong upward trend, but the growth in demand has exceeded the production increases. From a very low base, per capita consumption in China is rapidly increasing, but it remains at a relatively low 4.5 kg.

Broiler exports to many other countries, while small in comparison to Russia, Japan and Hong Kong/China, have been showing large increases. In general, there is a growing demand for broiler meat around the world. Per capita consumption is on the up tick in many countries. While production in most countries around the world is on an upward trend, output in many countries is not keeping pace with demand. This will support the anticipated growth in total U.S. broiler exports.

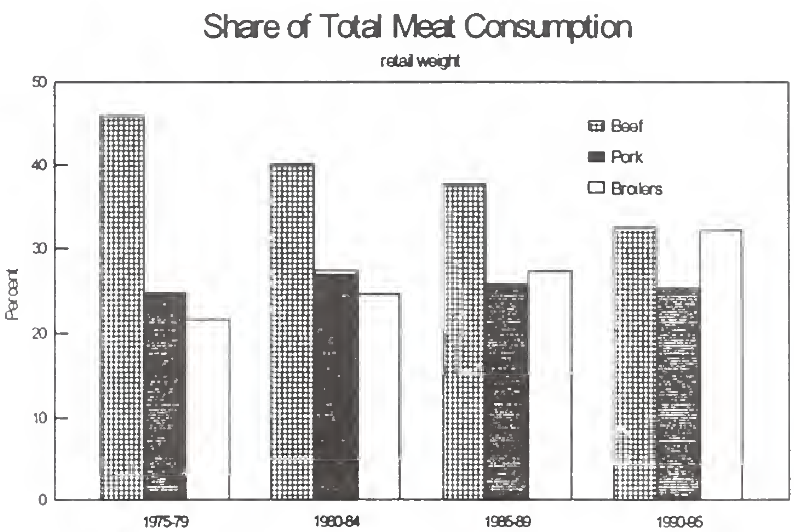
The growth in exports of products from the mature chickens slaughtered in the United States is nothing short of phenomenal. Exports in 1996 increased about 170 percent from the year-earlier level, and they were over 10 times the level of exports in 1990. Granted the base from which they started is low, but exports in 1996 were equal to about 55 percent of production. Another increase in exports is forecast for 1997.



Turkey exports have also increased sharply. In 1996, exports were up about 25 percent from the year-earlier level and were equal to about 8 percent of production. The 1996 exports were up over 700 percent from the 1990 level when exports were equal to only around 1 percent of production. Turkey exports are expected to increase again this year.

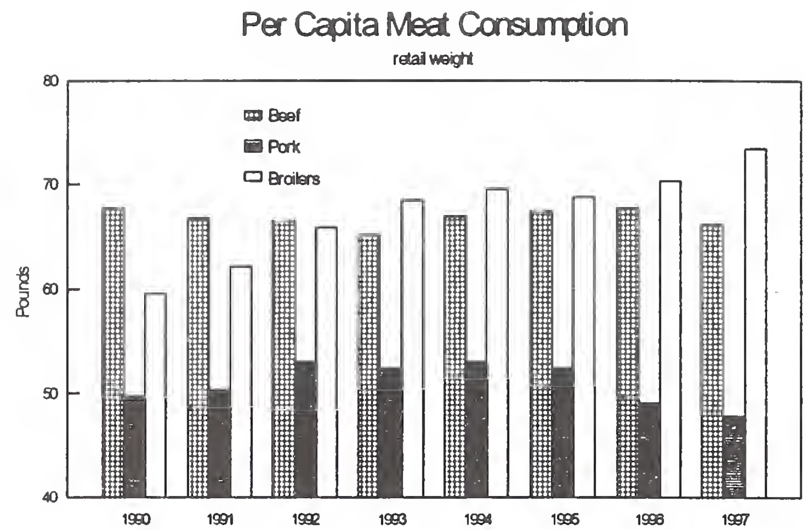
PER CAPITA DOMESTIC CONSUMPTION (DISAPPEARANCE)

Market shares claimed by the various meats continue to shift. Looking at 5 year averages from the mid 1970s to the mid 1990s gives a view of these shifts. During 1975-79, beef claimed over 45 percent of the market. This share slipped to just under one third in the 1990-95 period. Pork's share of the market has remained around the one fourth level. Broilers, however, have claimed a larger share, increasing from just over 20 percent during 1975-79 to almost a third during 1990-95. Last year, market shares stood at 32, 24, and 34 percent for beef, pork, and broilers, respectively.



On a retail weight basis, per capita consumption of all meats combined slipped slightly in 1995, but by historical standards it was still at a high level. This was the first decline since 1990 when per capita consumption slipped about 0.3 percent. Per capita consumption slipped further in 1996 when pork dropped about 6 percent. A slight rebound in per capita consumption of all meats combined is forecast for 1997 with gains in poultry more than offsetting a decline in red meats.

Per capita beef consumption in 1996 was little changed from the 1995 level. This year, per capita consumption will decline as beef production begins to slip and exports continue to increase. In 1998, the decline in per capita consumption will be even more pronounced when production drops sharply and exports increase. The continued growth in exports combined with lower beef output will reduce supplies available in the domestic market resulting in lower per capita beef consumption.



Per capita pork consumption dropped sharply in 1996 as producers curtailed production and exports increased. A further decline in per capita consumption is expected this year as production changes little from the 1996 level, and exports continue to grow. Unlike beef, however, 1998 should be a year of increased per capita consumption as pork production rapidly increases.

Despite the torrid pace of exports, broiler output continues to rise at a pace that supports increases in domestic per capita consumption. In 1996, per capita consumption (retail weight basis) exceeded 70 pounds, up almost 2 pounds from the 1995 level. Another increase is forecast for 1997 when about 3 pounds could be added to last year's total. Broiler producers are likely to look to the void that will be created in 1998 and 1999 when beef supplies drop and increase production sharply, resulting in further gains in per capita consumption and capturing a larger share of the meat market.

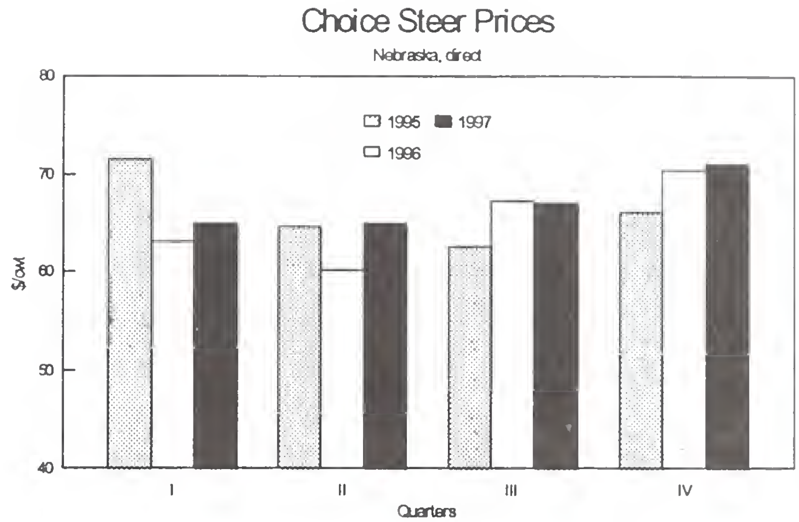
PRICES

Prospects are good that livestock and poultry prices in 1997 will be at relatively favorable levels for producers. Increased exports will be supportive of prices this year. Also supportive of prices will be a continued favorable economic situation. In 1996, real GDP increased nearly 2.5 percent and a similar increase is forecast for 1997.

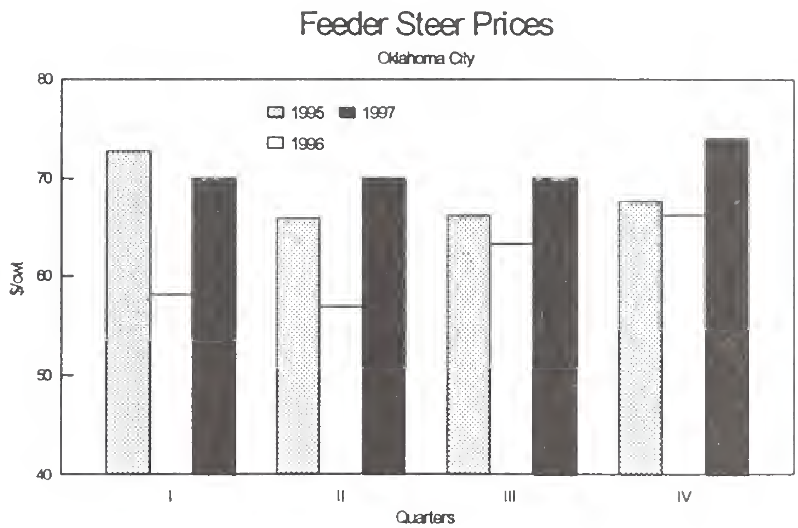
Higher Cattle Prices On The Way

The price for Choice fed steers on the Nebraska Direct market in 1996 averaged about a dollar per cwt below the 1995 level, the lowest annual average since the mid 1980's. Prices were highest in the second half of 1996 when supplies of grain-fed cattle dropped sharply because of the high feed costs that sharply reduced feedlot placements in the spring. Fed cattle prices will remain under the pressure of large supplies of fed cattle coming from feedlots this winter and into the spring. But, as we move into the second half of 1997, feedlot supplies are expected to tighten and support a recovery in fed cattle prices. Prices will continue to move higher in 1998 when beef supplies shrink. The magnitude of the increase will depend on several factors. Among these are changes in the availability of competing meat supplies, the strength of foreign and domestic beef demand, and the demand for the types and qualities of beef

that are available to various groups of users. For example, will a strong export demand for high quality beef leave the domestic market with tight supplies of Choice grade beef.



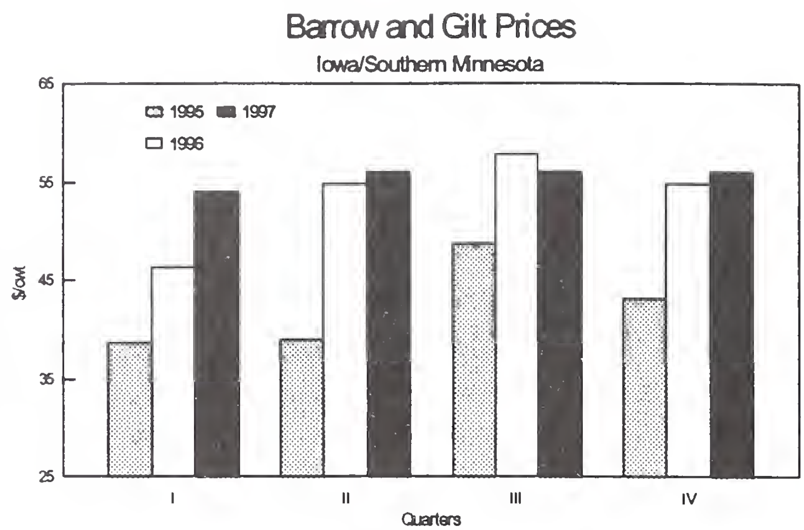
Feeder cattle prices are recovering from the very low levels to which they sank in 1996. Prices were already under the pressure of large feeder cattle supplies in 1995, and when the 1995 corn harvest turned out to be poor, this put even more pressure on prices. Cattle feeders entered 1996 with large supplies of cattle in feedlots and fed cattle prices that were sinking under the pressure of the large supplies. This combination of sinking fed cattle prices and rising corn prices put cattle feeders in the position of offering very low prices for replacement cattle for their feedlots. Further compounding the problem was drought in some areas and a sharp reduction in available forage supplies. The result was a very sharp drop in feeder cattle prices in the first half of 1996.



As fed cattle prices started to recover in the second half of 1996, feeder cattle prices also showed improvement despite the record high corn prices during the summer. As prospects for a good corn harvest in 1996 materialized, this added support to feeder cattle prices. For all of 1996, prices for 750-800 pound Medium #1 feeder steers at Oklahoma City averaged about $61 per cwt, about $7 below the previous year and more than $16 below the 1994 average.

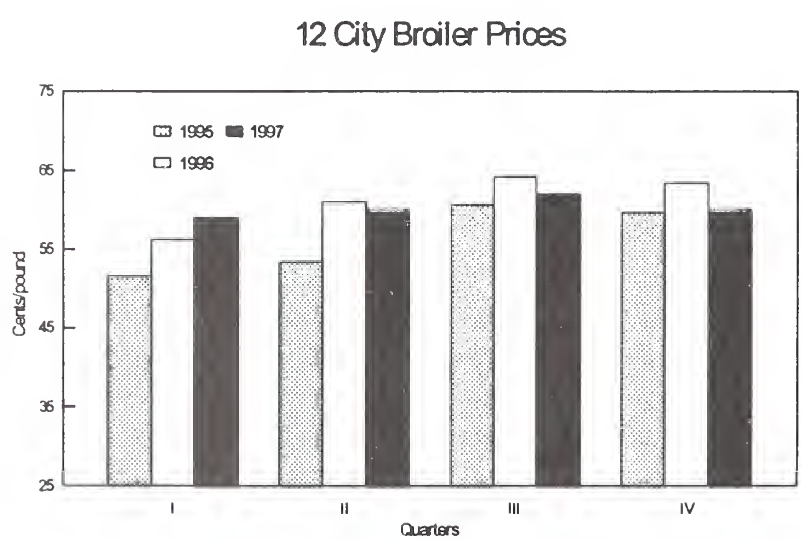
Feeder cattle supplies will tighten as we go through 1997 helping to boost feeder cattle prices. Lower corn prices in 1997, combined with higher fed cattle prices, will also help support an increase in feeder cattle prices. A 1997 average in the low $70 per cwt range now seems likely. Grazing conditions this spring and summer, and the size of this year's hay crop will have a big impact on feeder cattle prices. Dwindling feeder cattle supplies in 1998 should lend further support to another increase in prices in 1998, but again feed supplies and prices will be critical in determining the exact level of prices. With favorable feed supplies at reasonable prices, producers should see relatively favorable feeder cattle prices for the next several years.

Hog Prices To Remain Strong This Year, Weaken Next Year



Hog prices in 1996 rose sharply from the 1995 level, particularly during the spring. Supporting the sharp increases in prices last spring was a large decline in pork production. The decline was larger than most anticipated and caught many users with short supplies. Exports at that time were also moving at a very fast pace, helping boost prices. Spring quarter exports rose 61 percent above the relatively high level of the previous year. Another factor lending support to prices in 1996, was a strong demand for bacon by the fast food industry. This demand largely stemmed from the featuring of bacon/burgers by many of the fast food chains. The annual average price for 230-250 pound barrows and gilts in the Iowa/Southern Minnesota market during 1996 was about $53 per cwt, about $11 above the 1995 average. In 1997, prices are forecast to average a couple of dollars above the 1996 average. A sharp drop in prices is likely in 1998 when production increases, and prices for the following year will also be under the pressure of large supplies. A supporting factor for prices in 1998 and 1999 will be a lot less competition from beef, but it remains to be seen just how much this might be offset by increased poultry output.

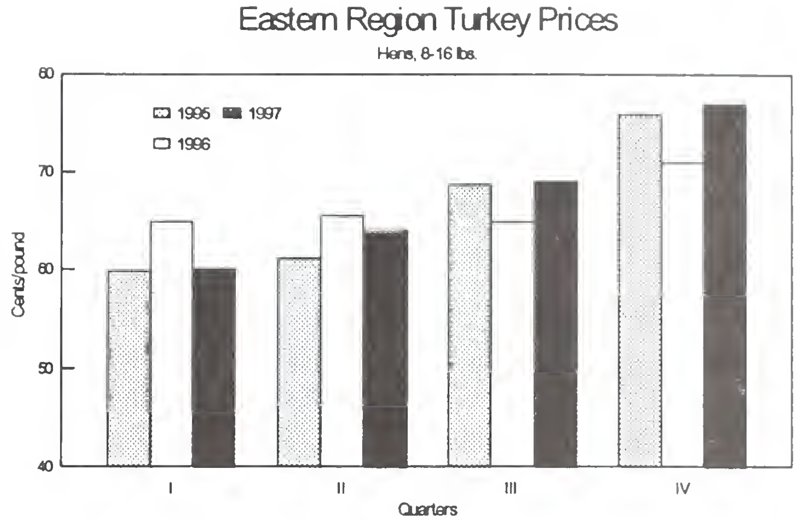
Strong Broiler Prices Likely To Continue



Even though broiler production increased over 5 percent in 1996 and per capita consumption rose around 2 pounds, the 12 city broiler price registered about a 5 cent per pound increase from the 1995 average. Prices are expected to continue at a relatively high level this year, even as production increases again. Lower pork production will be a supportive factor for broiler prices this year. The 1997 annual average, however, is expected to slip about 1 cent from 1996's average of 61.2 cents. Broiler prices in 1998 and 1999 likely will slip from the 1997 level as broilers find their niche between falling beef supplies and rising pork output.

Turkey Prices To Rebound

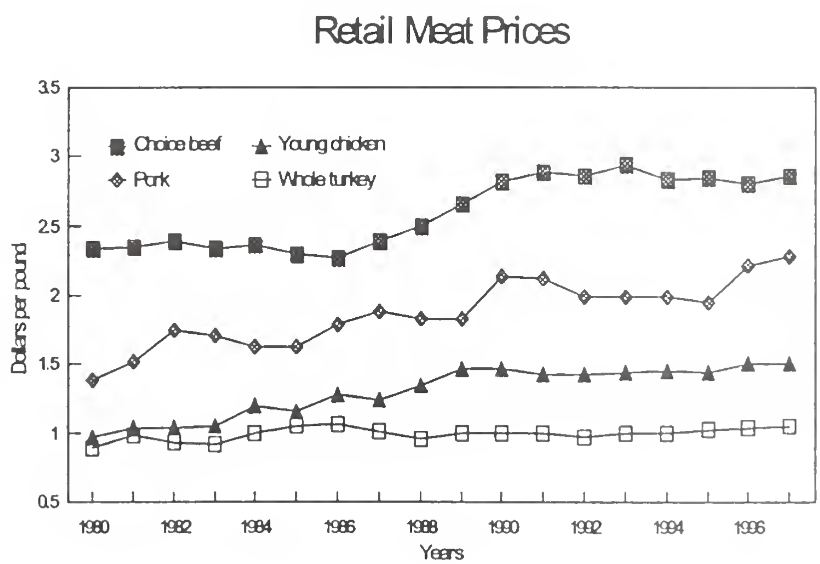
Turkey prices in 1996 averaged about the same as in 1995 and only slightly above the 1994 level. The largest year-over-year increases in output since 1990 kept prices under pressure last year. Early 1997 prices are down from a year ago, but stronger prices are expected in the second half of 1997. Lower pork production and higher pork prices in the fall will be supportive of higher turkey prices. In 1997, turkey prices are forecast to average slightly above the 1996 level.



Slightly Higher Retail Meat Prices In 1997

Retail meat prices have risen only modestly since 1990. In 1996, retail prices for Choice beef were slightly below the 1990 level, pork prices were up 4 percent, broiler prices were up 3 percent, and turkey prices were up 5 percent. The last significant increase in retail meat prices was 1990 when per capita supplies of both beef and pork declined, beef was down about 2 percent, and pork was down about 4 percent. The availability of relatively large domestic meat supplies in 1996 helped hold down the rise in overall retail meat prices from the 1995 level. Retail beef prices in 1996 were slightly lower than the previous year. Reduced pork output, however, sparked a sharp rise in pork prices and strong demand helped boost broiler prices.

For much of 1996, Choice grade beef was in relatively tight supply despite an increase in overall beef output. This helped hold up the retail price for Choice grade beef which is what is used in USDA's retail price spread series. The farm-to-retail spread for Choice grade beef in 1996 was slightly below the 1995 average. The spread may narrow a little in 1997 as beef supplies tighten and increases in retail prices lag gains in fed cattle prices. Retail prices for Choice grade beef are forecast to rise 1 to 2 percent in 1997. The upward pressure on retail prices will be more pronounced in 1998 when domestic beef supplies tighten substantially.



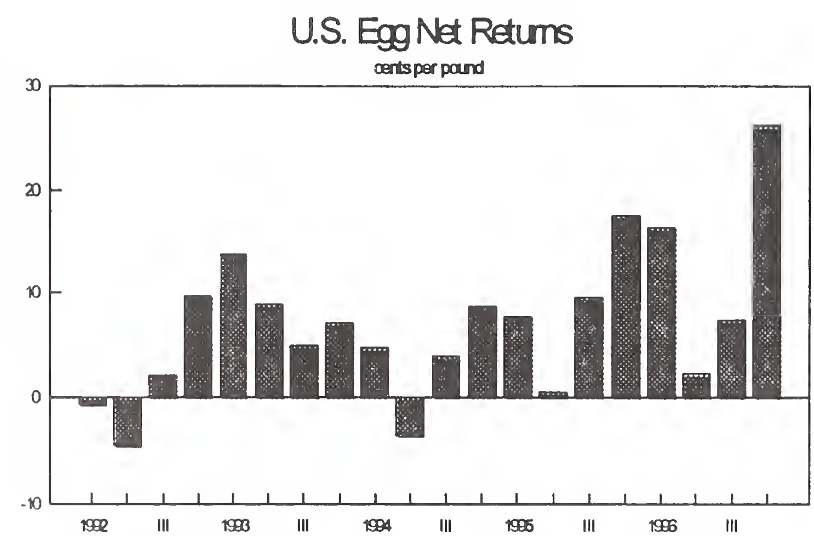
Retail pork prices rose sharply in 1996, the first significant increase since 1990. The retail price increase was supported by the reduction in pork output, but the strong export market and demand by the fast food industry also

meant less product on supermarket shelves and helped boost prices. The farm-to-retail price spread widened in 1996. The uncertainty over available supplies for supermarkets and their reluctance to feature pork at times probably contributed to this increase in the spread. Another increase in retail prices, perhaps in the 3 to 4 percent range, is in prospect for 1997. The farm-to-retail spread probably will remain relatively wide until production shows greater signs of expansion and retailers can make longer term plans for featuring. Exports patterns in 1997 will once again be unstable because of the Japanese SG mechanism. This will contribute to uncertainty about domestic availability of pork during periods when exports surge to beat the imposition of the SG. In 1998 and 1999, retail pork prices should be lower.

The young chicken composite retail price increased nearly 5 percent in 1996. Prices increased even as domestic per capita consumption of broilers rose about 2 pounds. Tight pork supplies at higher prices and a sharp increase in exports of the lower valued cuts of chicken helped support the rise in retail prices. This year, retail prices likely will show little change from the 1996 level. The retail price of whole turkeys increased about 2 percent in 1996, but this year they are expected to remain near the year-earlier level.

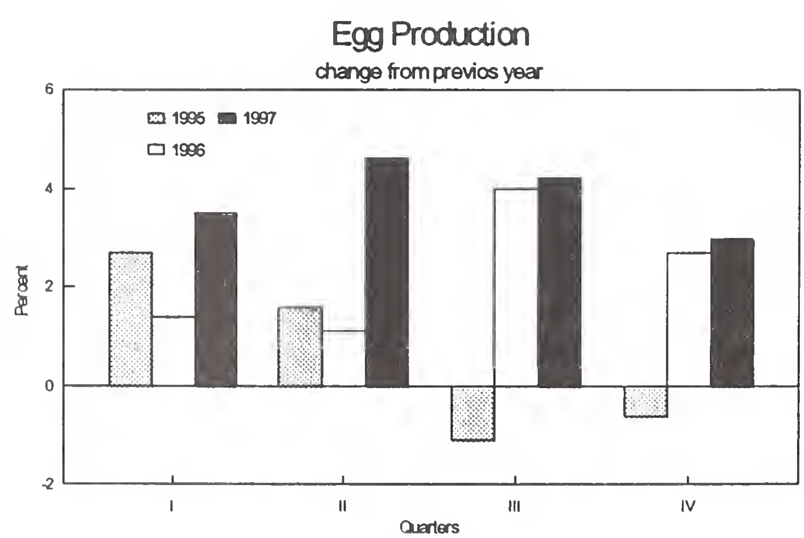
EGGS

Egg producers have enjoyed a profitable period during the last few years. Even though feed costs rose sharply in 1996, egg prices increased to levels that left producers in a profitable situation. The magnitude and the duration of the period of profits is almost unheard for the egg industry. Returns probably will be good again in 1997.



Further Increases In Production Likely

Egg production increased over 2 percent last year. The laying flock in 1996 averaged more than 1 percent larger than in 1995, and the number of eggs per layer increased nearly 1 percent. Egg production probably will increase again in 1997 as the profits that producers saw probably will prompt them to continue to expand output. On January 1, 1997, the laying flock was 2 percent larger than a year earlier, and the rate of lay on January 1 was up 1 percent. A 3 to 4 percent increase in egg production is likely for 1997.

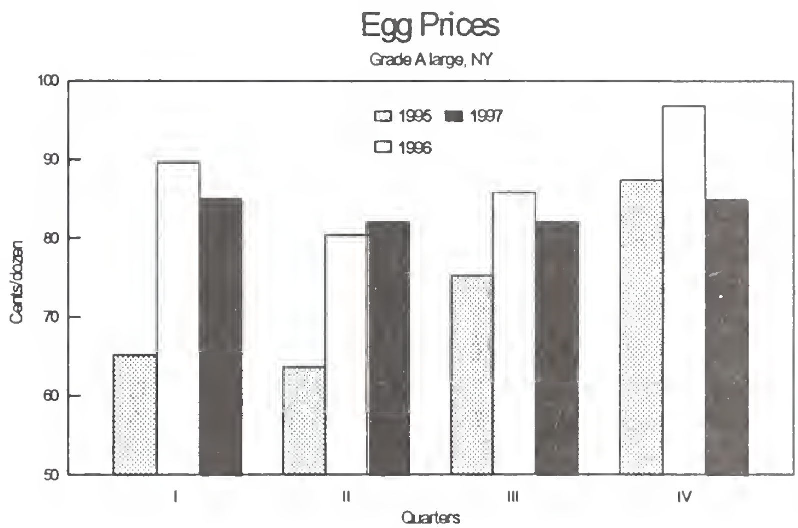


Egg Exports Increasing

The export market for eggs, like that for other poultry products, has been strong. Exports were up nearly a fourth in 1996, following strong increases in 1994 and 1995. Larger shipments of egg products were the chief factor in this strong increase as shipments of shell eggs rose only 6 percent. Foreign demand for egg products has been especially strong. Japan is the primary market for the egg products. The majority of the increase in egg product exports came from larger shipments to Mexico, Canada, and Japan. Together these 3 countries accounted for 88 percent of all egg product exports. Exports of egg products to Mexico increased the most, up 134 percent from the previous year. This is the sixth year in a row that exports of egg products to Mexico increased, from 2 million dozen in 1990 to an estimated 35 million in 1996. During 1996, almost all the increase came from increasing exports of dried egg albumen for use in prepared food products. Shell egg exports to Hong Kong have also been strong. Further increases in egg exports are expected in 1997.

Prices To Slip From The Highs In 1996

The Grade A large egg price on the New York market averaged over 88 cents per dozen in 1996, up about 15 cents from the 1995 level. Prices averaged over a dollar a dozen during November and December with a fourth quarter average of 96.7 cents. Strong domestic and foreign demand helped boost prices. Shell egg movement through retail outlets has been strong and per capita consumption of shell eggs in the United States increased fractionally last year, the first increase since 1979.



The increasing trend in eating breakfast away from home probably contributed to the increase in both egg product and shell egg consumption. Studies have shown that away from home breakfasts increased 24 percent between 1989 and 1993. They also show that the egg content of breakfasts eaten away from home is much higher than breakfasts eaten at home. Furthermore, the American Egg Board reports that a 1995 survey showed 12 percent of food service operators increasing egg use at lunch and 6 percent increasing use at dinner.

Prices remain at relatively high levels in early 1997, but weaker prices are in prospect later this year due to strong growth in production. For all of 1997, prices probably will average about 5 cents per dozen below the 1996 level.

Retail egg prices rose sharply last year, up nearly 20 percent. The sharp increase in output that is expected this year will push retail prices lower.

ARE CONSUMERS GETTING WHAT THEY WANT?

Kevin Bost
Commodities Analyst, Topco Associates, Inc.

In order for any business to grow, it has to adapt to changes in the tastes and preferences of its customers. For the meat industry, this means changing the characteristics of the raw material -- i.e., livestock. They have to produce what consumers want. The poultry sectors are making this transformation more quickly than either beef or pork, due to a more streamlined industry structure. The key is the ability to pass economic signals from the consumer to the producer, creating economic incentives to alter production practices as consumer preferences change.

What do consumers want? The major trends are pretty well-documented. Consumers want meat products that are easy to prepare; products that taste good; products that look good; products that are relatively inexpensive; and products that are safe to eat.

However, we have to recognize that not all consumers want the same thing. Some are more health-conscious. Some are more taste-conscious. Some are more price-conscious. Processors and retailers are diversifying their product lines to appeal to different segments of their customer base. For example, many retailers who used to sell only one grade of beef are now operating a "two-tiered" program -- they offer both select and choice beef, or select and Certified Angus Beef in the same meat case. The select-grade product permits them to run "hot" features, catering to the price-driven customer, while the choice or premium-grade product caters to the customer who considers taste and tenderness more important than price.

Recent consumer research indicates that an increasing amount of.money is being spent for food prepared away from the home. Much of this growth appears to be among take-out restaurants -- not necessarily the traditional fast-food chains, but any place where a customer can make a phone call, pick up their order, take it home, and eat it. This trend has given rise to one of the latest buzzwords in the food industry, the category known as "Home Meal Replacements". People order out primarily because they don't have much time, and because they know what to expect in terms of taste and appearance. Quite likely, they are looking for the same qualities in the meat they buy at the supermarket.

How does the meat industry fit into this profile?

Poultry producers -- especially the chicken industry -- seem to be doing the best job of delivering what consumers want. Chicken companies have managed to expand their output every year since 1975, while maintaining profitability. Improvements in production efficiency have helped make this possible, as well as expansion of export markets. But the dramatic growth that has occurred over the past 20 years would not have been possible if the industry were not focusing on the consumer, and making products which had the qualities people were looking for.

The pork industry probably ranks second in this respect. Pork producers, and the National Pork Producers Council in particular, have made great strides in the last 10 years. Hogs are much leaner and more uniform than they were just 10 years ago. Pork is marketed much differently than it was 10 years ago, with a number of products now being promoted as specific ingredients of specific recipes. NPPC's trademark America's Cut has been successful, one reason being that this product must meet certain specifications in order to be marketed as such. Consequently, every time a consumer buys an America's Cut boneless pork chop, he knows what he's buying. There is still a significant amount of variation in the color and the texture of fresh pork in general, however, and a lot of the fresh pork sold over the retail counter requires a substantial amount of preparation. Thus, there is room for improvement. But the pork producers as a group are well-organized, and they seem to have a consumer-oriented focus. Most importantly, the hog marketing system has evolved into something that should facilitate those consumer-oriented goals. The pricing system is the key.

The beef industry has the farthest to go. To a large extent, retail beef products require some time and effort to prepare. The beef industry has some work to do in the way of marketing and product development. A separate issue, and one that is probably more difficult to address, is the variation in product quality. There is more variation in beef quality and appearance than in either pork or poultry. Generally speaking, when people buy beef, they can't be real confident that they're going to get what they expect. This is true to a certain extent for restaurant customers, and it's especially true for supermarket shoppers. Some of that variation in quality is obvious in the retail meat case display. Within a single display there are typically wide variations in product color, marbling, size, and taste. To the extent that the consumer has to gamble on the taste of the product, demand for beef is reduced.

Is the beef industry delivering what consumers want? Not exactly. Why? In large measure, it's because ranchers and cattle feeders aren't being paid to produce what consumers want, at least not in terms of taste and consistency. It's nobody's fault in particular, it's just a flaw in the pricing system.

Consider the way that fed cattle are bought and sold. On a liveweight basis, many cattle are bought and sold by the pen. If a pen of cattle is estimated to be about 50% USDA choice, that pen will bring a certain price. If the pen is estimated to be 65% choice, it will bring a slightly higher price. But a single price will be paid for the entire pen. In many cases, the packer will pay the same price for a high choice carcass as for a medium select carcass, simply because they are in the same pen. Those two carcasses, after they're boxed up, are going to bring much different

prices in the wholesale market, and will look and taste completely different on somebody's plate. Yet the packer is paying the same price for both of them, because those two cattle are in the same pen.

We talk about how important it is to transmit economic signals from the consumer to the producer. Isn't the signal getting scrambled at this point in the marketing chain?

If a packer is paying one price for a whole pen of cattle, based on the average characteristics of the group, what kind of signal does this send to the cattle feeder? It's not giving him much of an incentive to produce choice cattle, and it's not giving him any incentive to produce cattle that look alike. If I'm a cattle feeder selling cattle this way (by the pen), trying to maximize my profits, I'm going to source feeder cattle that will grow fast and convert feed efficiently. That's what the market is paying me to do.

So then, what kind of signal is the calf producer receiving? The calf producer is controlling the genetic makeup of the entire beef supply. He is being paid only to produce big, healthy calves that will grow fast, and convert feed efficiently.

Fast-gaining and efficient feed-converting cattle are not all bad, because these characteristics help hold down the cost of the final product. However, efficiency in the feedyard may not have much to do with meat quality or uniformity, things that are important in meat merchandising.

True, a fair number of cattle are priced "in the meat", or on a carcass basis, and even among cattle that are priced on a liveweight basis, there are premiums and discounts for USDA yield grade and quality grade. But these premiums and discounts are pretty small compared with the differentials that exist in the beef market.

For example: A packer may buy a pen of cattle and pay $63/cwt for the whole pen. In that pen there may be a choice yield grade 1 steer, and a select yield grade 3 steer. Under a typical liveweight pricing grid, he will wind up paying $66/cwt for the choice Y1 steer and $62/cwt for the select Y3 steer -- a difference of $4/cwt. Based on the current beef market, however, if both of those carcasses are fabricated into close-trim, the choice Y1 steer is actually worth $8.48/cwt (on a liveweight basis) more than the select Y3 steer. The value differential in the wholesale beef market is more than twice as large as in the live cattle market.

Calculating those values for each week in 1996, the average difference in value between a choice Y1 and a select Y3 in the close-trim wholesale beef market was $11.28/cwt live.

This brings up another point. Under the current pricing system for live cattle, it's not economical for the packer to fabricate a yield grade 3 carcass to close-trim specs -- choice or select. He has to cut too much fat off the Y3 carcass to make it work for him. Consequently, the vast majority of close-trim beef is probably coming out of yield grade 1's and 2's, while the yield grade 3's are going into commodity beef. This is limiting the total supply of close-trim beef. It's generally

agreed that it's more economical and more efficient for the trimming to take place in the packing plant as opposed to the back room of a retail store. So it's not surprising that more and more retailers are converting to close-trim beef. Production of close-trim beef increased dramatically over the past several years, a very positive development. But further progress is unlikely until the pricing system for live cattle is changed.

The major point is that the prices paid for live cattle generally don't reflect the value of those cattle in the wholesale meat market. There's not a clear economic signal being passed from the consumer to the producer. That's impediment to delivering what the consumer wants.

Compare this to the hog marketing system. Ten years ago the pork industry had the same problem. But they've changed. It used to be that all hogs brought the same price at the buying station, almost without regard to the type of hogs that were delivered. Under that system, a hog producer was encouraged to produce the cheapest hogs he could, regardless of quality. Today, however, every hog is priced individually, according to carcass weight and lean content. Through this evolution in the pricing system, the pork industry has managed to eliminate the bottom end of the pork supply.

The chicken industry has evolved even further, to the point that there no longer exists a market for live chickens. The people who are making the end product are essentially producing their own birds, albeit under contract. Under this integrated arrangement, with focus being on the end product, the genetic strains of chickens being produced today are not necessarily those which grow the fastest or convert feed most efficiently; they are the strains which have the carcass characteristics which fit the kinds of products that consumers are demanding.

There is a big difference in the marketing systems between poultry, hogs, and cattle, and these differences have a major impact on the ability to transmit economic signals from the consumer to the producer. The beef industry does not lack for a willingness or desire to improve the overall quality and consistency of its product. But in order to get people to change the way they do things, you have to make it worth their while economically. In order for the beef industry to deliver the product that consumers want, cattle must be priced individually, and there will have to be more price discrimination between carcasses, based on the characteristics that are important to consumers -- meat quality and cutability, appearance, and uniformity, among others. Once that's accomplished, we might be surprised at how quickly things will change.

THE COTTON MARKETING CHALLENGE

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Step by slow step the United States cotton grower has gingerly been weaned from the government's involvement in his production decisions. Likewise, the price and income support programs that accompanied such involvement are a part of the past, not the future. The passage in 1996 of the FAIR Act reversed a trend of government involvement in agriculture that had its roots in the era of the Great Depression. With the exception of transition payments that will continue through 2002, the government has removed itself from any direct price or income support program for cotton growers, the CCC loan programs not withstanding. The withdrawal of federal supports, exposure to global markets and rapid changes in technology (transgenic cotton, etc) all combine to make the future of the U. S. cotton industry difficult to predict.

Some growers foresaw this changing environment and began to hone both their production and marketing risk management skills. Others will follow suit if they are to survive. This new transition brings growers to the very threshold of survival. The new decision environment also requires more grower attention to crop selection, financial risks, machinery and equipment complements, tenure arrangements and access to information.

Thus, growers need accurate and timely outlook information more than ever before. Fortunately, the information revolution has provided the industry with the ability to survey information sources daily. Yet, two age old marketing adages will continue to mark the success of the individual grower. Those are: (1) Know your cost of production and (2) Always be willing to take a profit. Some may try a different twist or add a new spin, but such efforts will be little more than window dressing.

The fundamentals of supply and demand will ultimately determine price. However, cotton growers must be mindful that marketing in this new environment also requires an understanding of all elements of market analysis. There is no substitute for market planning. The removal of a government supported income safety net dictates that marketing become a primary component of every grower's decision making process. The grower has three choices...(1) He can make the time commitment to perform this task for himself, (2) He can hire a consultant capable of providing specific information, or (3) He can contract with a marketing cooperative organization to provide this service. These are his choices, his future.

U.S. AND FOREIGN OUTLOOK FOR COTTON

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The theme of the 73rd Agricultural Outlook Forum, "Charting a New Course," seems fitting as agriculture readies itself for the 21st century. While there have been disappointments and surprises in some countries in 1996/97, world cotton markets have been relatively calm in comparison to previous years.

In one important milestone, however, the U.S. cotton crop in 1996 was the first produced under the program outlined in the 1996 Farm Act. This legislation provides a more market-oriented farm program which eliminated controls and legislated targets, along with "crop specific" base acreages. The Farm Act encourages producers to respond more to the marketplace with increased planting flexibility, relying less on government payments which are not affected by either planted acreage or market prices.

In 1996, producers did respond to the marketplace as grain prices soared and cotton area declined. As planting time approaches once again, 1997 is shaping up to be another interesting year for cotton. But before addressing the upcoming 1997/98 season, a brief review of the latest 1996/97 supply and demand estimates in the United States and abroad is presented.

1996/97 U.S. Cotton Situation

U.S. cotton supplies at the beginning of 1996/97 were 2.6 million bales, the lowest since the 1991 season. Cotton prices remained relatively high, but with the new farm legislation in place, competing crop prices played a vital role in the area planted to cotton in 1996. Record grain prices attracted area away from cotton as many producers took advantage of the new flexibility provisions and switched to the lower-cost grain crops. As a result, U.S. cotton area fell 13 percent from 1995 to nearly 14.7 million acres. Upland area this season was near 14.4 million acres, down from 16.7 million a year ago. On the other hand, ELS area rose to 258,000 acres, 43,000 above 1995, as high ELS prices encouraged the increased plantings. Despite the reduction in total area in 1996, the national average abandonment rate was well above last season at 12.5 percent, or 1.8 million acres. With the higher abandonment, harvested area, at 12.8 million acres, was the smallest in 4 years.

U.S. cotton production in 1996/97 is estimated at nearly 19 million bales, up from last season's 17.9 million and the second largest on record. With the smaller harvested area this season, the production rise is attributable to a rebound in the national average yield. The U.S. cotton yield is estimated at a record 709 pounds per harvested acre, 172 pounds above last season.

Upland production is forecast at 18.4 million bales in 1996, with the average yield estimated at 703 pounds per harvested acre. While expected production is higher in all regions this season except the Southwest, yields are much improved for each region. ELS production is forecast at 533,000 bales, 45 percent above 1995. The rise in the ELS crop is due to both higher acreage and yields. While the area jump was attributable mainly to California, yields were better than 1995 in all States. The ELS yield is estimated at 998 pounds per harvested acre, only 2 pounds from the record set in 1987.

Total U.S. cotton supplies in 1996/97 will once again include a relatively large quantity of imported cotton, as purchases made late last season made their way into the United States early this season, particularly in August and September. During the first 5 months of this season, imports have already reached 396,000 bales, with the major suppliers including Uzbekistan, Argentina, Australia, and Mexico. However, more recent customs data indicate that imports into the United States have virtually stopped. Raw cotton imports are projected at 400,000 bales for 1996/97, similar to the 408,000 bales imported in 1995/96. Including imports, total U.S. cotton supply is projected at 22 million bales, 1 million above last season.

The 1996/97 demand outlook points to a back-to-back decline in total U.S. cotton offtake. Total demand is projected at 17.5 million bales, 4 percent below 1995/96 and nearly 15 percent below 1994/95. U.S. exports are responsible for the bulk of this reduction as foreign supplies, which have been building over the past two seasons, have become more competitive with U.S. cotton on the world market. Relatively high U.S. prices, which aided the sale of foreign cotton to U.S. mills last summer, also limited prospects for U.S. cotton exports early in 1996/97. Recently, however, the gap between U.S. and world prices has narrowed significantly and the prospects for U.S. exports have risen. Exports are now projected at 6.5 million bales, still 15 percent below 1995/96. Reduced U.S. exports are the result of lower imports by China and higher exports by India, Australia, and Argentina. While upland exports are expected to decline 1.3 million bales this season to 6.1 million, ELS shipments are forecast to rise to 435,000 bales, the second highest ever.

Foreign competition has eroded the United States' average share of the export market this season. In 1996/97, the U.S. share of world trade is projected at 24 percent, down from 28 percent in 1995/96 and 33 percent in 1994/95. U.S. export shares to major importers also are projected to fall from last season, but the United States still is expected to supply more than half the import demand of China, Japan, Korea, and Mexico.

Based on *U.S. Export Sales* data through mid-February, nearly 2.8 million bales of upland cotton had been shipped, compared with 4.4 million a year earlier. Total commitments (shipments plus outstanding sales) for 1996/97 also are lagging the pace set last season. Upland commitments through mid-February were 5.5 million bales, compared with 7.6 million in 1995/96. On the other hand, ELS shipments and total commitments are running ahead of last season's pace. Exports had reached 250,000 bales, with commitments totaling 458,000 by mid-February, 48 and 39 percent above 1995/96, respectively.

Meanwhile, U.S. cotton mill consumption is projected to rise in 1996/97 after experiencing its first decline in 5 years in 1995/96. The latest estimate places 1996/97 mill use at 11 million bales, up 400,000 bales (nearly 4 percent) from last season. Abundant supplies at lower prices this year, coupled with an improving outlook in retail consumer demand for cotton products both here and abroad, should provide the boost in U.S. mill consumption. However, a decline in denim production may dampen the outlook somewhat as inventories in this sector have risen recently. Upland mill use in 1996/97 is projected at 10.9 million bales, while ELS consumption is expected to reach 105,000 bales.

Based on the first 6 months of data from the Department of Commerce, the seasonally adjusted annual rate of cotton consumption averaged 10.9 million bales. Actual cotton mill use for August 1996 through January 1997 reached 5.45 million bales, compared with 5.21 million a year earlier. At the same time, cotton's share of fiber use on the cotton system is near that of last season. During the first half of 1996/97, cotton's share averaged 77.8 percent, similar to 1995/96's 78.1 percent.

Aiding both cotton consumption and share is the continued success of U.S. cotton textile exports. For calendar 1996, cotton textile exports rose for the 12th consecutive year, reaching 3.1 million bale-equivalents (1.5 billion pounds), nearly 14 percent above 1995. At the same time, cotton textile imports totaled 8.7 million bale-equivalents (4.2 billion pounds), 3 percent above 1995. With textile exports improving faster than imports, the cotton textile trade deficit in 1996 fell for the first time in 6 years to the equivalent of 5.5 million bales of raw cotton. Meanwhile, total domestic cotton consumption (mill use plus net textile trade) decreased for the 2nd consecutive year, with per capita consumption dipping below 1995's 30 pounds to 29.5 pounds in 1996.

Based on these projections of U.S. cotton supply and demand, ending stocks for the 1996/97 season are estimated at 4.45 million bales. With U.S. stocks anticipated to jump 1.8 million bales from the beginning level, the ratio of stocks-to-use is projected at 25.4 percent, compared with the previous 5-year average of 20.1 percent.

1996/97 Foreign Cotton Situation

Foreign cotton production in 1996/97 is estimated at 67.3 million bales, 6.8 million (9 percent) below the 4-year high reached in 1995/96. Relatively lower prices this season, prompted by the rising foreign supplies and carryover of 1995/96, led to a decrease in cotton area in 1996/97. Harvested area decreased nearly 3 percent to an estimated 28.2 million hectares, while 1996/97 yields averaged 518 kg/ha, the lowest in 3 years.

The decrease in cotton production is attributed mainly to large reductions in China, Pakistan, the Former Soviet Union (FSU), Greece, and several South American countries, including Brazil. The demand for more area for grains and non-agricultural purposes squeezed cotton area in eastern China. In addition, pest damage and unfavorable weather resulted in a 10-percent decline in yield, lowering China's 1996/97 cotton production forecast to 17.5 million bales, 4.4 million below 1995/96. Similarly, high cotton production costs in many Latin American countries resulted in large area shifts to more profitable crops. Notably, Brazilian harvested area declined 34 percent from 1.1 million hectares in 1995/96 to 750,000 hectares in 1996/97. In addition, Colombia and Paraguay experienced 24 and 36 percent declines in their harvested area, respectively. Although FSU area was only slightly lower in 1996/97, cotton production there declined 20 percent due to unfavorable weather and government policies in some countries that provided little or no real incentives for farmers to plant, grow, and harvest cotton. Also, adverse weather conditions and flooding significantly reduced cotton yields in Greece, leading to a 25-percent reduction in output from 1995/96's 10-year high of 2.1 million bales.

Despite the overall decrease in foreign production in 1996/97, many countries witnessed a continued growth in cotton area and yield. Larger area and a record yield have resulted in an anticipated record Australian crop of 2.6 million bales, 35 percent above 1995/96. Similarly, favorable growing conditions are expected to lead to a near record crop in Argentina. Many of the Middle Eastern and African countries also witnessed large increases in cotton area and production. Cotton area in Franc Zone African countries increased from 1.6 million hectares in 1995/96 to more than 1.7 million in 1996/97, while cotton production in the region grew by an estimated 16 percent to 3.6 million bales. Egypt witnessed nearly a 50-percent increase in cotton production, with 1996/97 estimated at 1.6 million bales. Similarly cotton area increased significantly in Syria and Uganda.

Unlike production, foreign consumption is expected to rise slightly in 1996/97 to 74.8 million bales. Back-to-back increases in cotton use are a positive sign and may indicate a return to an upward trend after 5 consecutive years of decline. Consumption increases in a number of countries more than offset decreases in China, Western Europe and some countries in the Far East. Consumption has been notably strong in Latin America, especially in Mexico where during the past two years, mill use of cotton increased by more than 30 percent. Moderate gains in cotton use are also noted in Brazil, Peru, Colombia, and Guatemala. Outside of Latin America, cotton consumption has been growing in India and Turkey due to the continued expansion of their textile industries. Within the last decade, Turkey's cotton consumption has grown by about 65 percent, while India's has grown by nearly 50 percent. During MY 1995/96, India consumed 11.4 million bales of cotton, surpassing the United States as the world's second largest consumer of cotton. For MY 1996/97, India is expected to maintain its position behind China, with consumption projected at 11.8 million bales.

Foreign cotton imports in 1996/97 are projected at 26.7 million bales, slightly lower than the year before due to a 38-percent reduction in China's imports. Excluding China, however, lower production in countries such as Pakistan and Brazil actually resulted in higher foreign import needs. Brazilian imports, in particular, are estimated at 2.4 million bales (a 41-percent increase) this season, placing Brazil as the world's leading cotton importer in 1996/97. Total foreign exports are estimated at 20.4 million bales, up 700,000 bales from 1995/96. Large export decreases from the FSU and Pakistan were more than offset by increases by India, the Franc Zone African countries, Australia, Argentina, and Egypt.

In 1995/96, foreign ending stocks were at a 10-year high, but they are expected to shrink 1.4 million bales in 1996/97 to 32.3 million, or 43 percent of expected foreign consumption. Lower ending stocks in several exporting countries--notably India, Pakistan, Uzbekistan, and Turkmenistan--may bode well for U.S. exports in 1997/98.

1997/98 Foreign Cotton Outlook

Shifting to 1997/98, total foreign cotton demand (consumption plus exports) next season is projected to rise to 96 million bales, nearly 1 million above the 1996/97 estimate. With world cotton exports about unchanged and U.S. exports likely to rise in 1997/98, foreign cotton exports are projected to dip below 20 million bales once again.

While foreign cotton consumption fell steadily during the 1990's until 1995/96, a modest gain since then is expected to continue into 1997/98. Foreign mill use is projected to improve 2 percent next season to 76.3 million bales, the highest in 6 years as consumption slowly rises toward the levels achieved during the late 1980's. While most of the consumption declines experienced during the early 1990's can be attributed to China, the Former Soviet Union, and Eastern Europe, foreign consumption excluding these regions has grown at a relatively steady 1.5 percent rate every year since 1986/87. Contributing to this steady growth are India and Pakistan, whose combined consumption has risen from 7.5 million bales in 1981/82 to an estimated level of nearly 19 million in 1996/97. For 1997/98, these two countries together are likely to surpass 19 million bales of consumption.

In China, the positive effects of continued relaxation of credit by the central government will have to be balanced against the likely continued pressure on unprofitable state-owned firms, including textile mills. Large supplies of cotton suggest a good possibility that--as in the past--the holders of cotton in China will increasingly come to terms with the consumers, permitting a rebound in China's cotton consumption. China's yarn production climbed to a record-high in November 1996, suggesting a recovery has begun.

The other major problem area in foreign cotton consumption during the 1990's has been Russia. During the restructuring of Russia's political, economic, and foreign trade systems, consumption fell more than 80 percent between 1989 and 1996 to 1 million bales. The OECD is forecasting Russia's long-postponed rebound in GDP to begin in 1997, and by 1998, Russia's GDP could be growing as rapidly as in the more successful Eastern European economies.

Although foreign consumption is improving and stocks are lower than the year before, world cotton prices through mid-February were about 5 cents below the previous season's average. While competing crop prices also have fallen, foreign area next season is expected to decline for the second consecutive year. Area is projected at the 5-year average of 27.7 million hectares, or about 2 percent below 1996/97. Meanwhile, yields are projected to return to the 5-year average of 538 kg/hectare, assuming normal weather. Based on these area and yield projections, foreign cotton production in 1997/98 would increase slightly from the year before. The early projection for foreign production is 68.4 million bales, 1.5 percent higher than in 1996/97.

China lost its position as the world's largest producer during 1996/97, and it is questionable whether it can regain that position in 1997/98. China's State Statistical Bureau (SSB) recently announced that China's 1996/97 crop was higher than widely believed, 18.4 million bales, nearly 1 million above their earlier estimates. Whatever the size of the crop, it is clear that last year's procurement problems were repeated, and farmers were unable to sell large amounts of cotton to the state. On the one hand, this suggests farmers will lose enthusiasm for cotton production, resulting in a lower crop. On the other hand, grain production has soared in China, and market forces and government policy may be less encouraging for grain during 1997/98. Assuming normal weather, China's cotton crop could be little changed compared with this year.

In India, relative prices of competing crops will probably lead to some shifts from cotton in 1997/98. Weather is of course a key unknown, and estimates of Indian yields are prone to large revisions very late in the season. Assuming weather comparable to recent years, India's production should drop, but could still

easily surpass the harvests typical during the early 1990's. In contrast, short supplies during 1996/97 in Pakistan should lead to good price expectations for producers--maintaining current cotton area. Assuming average pest and weather patterns, yields should rebound from 1996/97's lows leading to a slightly larger Pakistani crop for 1997/98.

For Central Asia, like Pakistan, a return to more normal conditions suggests larger production is possible during 1997/98. In Uzbekistan, a rebound seems likely since weather played a large role in reducing the 1996/97 crop. Cotton area in Uzbekistan is about where the government has in the past indicated is appropriate, so little change should be expected. While yields may not rebound completely in 1997/98, they could rise considerably and still remain well below most of the 1990's. Turkmenistan is more problematic, since production losses of the last few years are only partly weather-related. If recently announced government policies to privatize agricultural holdings are implemented in time, Turkmenistan's cotton production could rebound starting in 1997/98.

Brazil has also been on a downward trend in cotton production, driven by foreign competition, changes in farm credit policies, and--most recently--high returns for competing crops like soybeans. Lower soybean prices during 1996/97 could bring some area in Brazil's Center-South back to cotton in 1997/98, and the crop could rebound from this year's low. However, with low carryover, cotton imports will remain about the same.

In Turkey, a smaller cotton crop in 1996, coupled with a larger wheat crop and the government's apparent efforts to slow wheat imports, suggests competing crop prices will favor cotton. However, Turkey's National Cotton Advisory Council has forecast area down, suggesting 1997/98 production may be lower as well.

Franc Zone Africa seems to have strongly responded to the devaluation of the CFA franc a few years ago. Cotton is a lucrative cash crop for the region and production is also supported by favorable agricultural policies in the region and reform of the region's marketing boards for cotton and other crops. An unchanged crop is consistent with earlier experiences during falling prices, although lagged impact of widespread economic reforms could mean continued growth in production and exports.

Australia's 35 percent surge in production during 1996/97--despite falling prices--is attributed to weather, since 1996/97 was the first year of the 1990's that entered planting with good reservoir supplies. As lower prices will probably shift some area away from cotton, the 1997/98 Australian cotton crop is likely to be smaller than the current season's.

Similarly, Argentina--while keeping area near the unprecedented highs of the last 2 years--could plant less cotton in response to this year's prices. Liberalization, modernization, and mechanization suggest area will stay near the new levels rather than revert to the old. Argentina's agriculture has undergone tremendous changes during the 1990's, with planted area soaring for a wide variety of crops as investors exploit Argentina's potential.

Although foreign production is projected higher, imports also are likely to rise to satisfy the expanding consumption needs. Brazil's economic recovery, for example, should push textile demand there upward, resulting in Brazil remaining the largest cotton importer for the second year in 1997/98. With respect to China, the size of their usable cotton stocks will likely determine whether imports will continue declining in 1997/98, assuming fairly constant production. Joint-venture mills will again be the most likely major importers in China. In addition, larger imports by Russia are likely as a result of the revitalization of their textile sector. Cotton imports by Turkey and Mexico also are expected during 1997/98.

Based on these supply and demand projections, little change is foreseen in aggregate foreign cotton supply in 1997/98 compared with the year before. And with total demand rising slightly next season, foreign ending stocks in 1997/98 are projected to fall 4 percent (1.3 million bales) to 31 million bales. A somewhat tighter foreign stocks-to-use ratio in 1997/98 would imply that U.S. cotton would be more competitive and could capture a larger trade share compared with 1996/97.

1997/98 U.S. Cotton Outlook

Turning to the U.S. outlook for 1997/98, let us first examine the demand possibilities. U.S. cotton exports in 1997/98 are expected to rebound somewhat from the declines experienced during the previous two seasons. The early projection for U.S. cotton shipments during the upcoming season is 7 million bales, nearly 8 percent above 1996/97. Although near the 5-year average, the projected export level would represent an improvement in the U.S. share of world cotton trade from 24 percent in 1996/97 to more than 26 percent in 1997/98. While a large jump in foreign production in 1995/96 provided the competitive exportable supplies this season, U.S. cotton should be in a more favorable situation in 1997/98 to help supply the anticipated rise in world consumption. The United States will begin the 1997/98 season with more than 4 million bales of carryover, a first in 4 years, while several U.S. competitors' supplies will have declined.

Like exports, U.S. cotton mill consumption is projected to improve from 1996/97, although the rate of growth will likely be smaller than the average annual increases experienced in the early 1990's. The preliminary estimate places U.S. mill use at 11.2 million bales, about 2 percent above the 1996/97 estimate. In 1997, cotton textile exports are again expected to play a vital role in U.S. cotton mill demand. As mentioned earlier, U.S. cotton textile exports in 1996 rose for the 12th consecutive year to a new record. The continued success of U.S. cotton textile and apparel products abroad, as well as cotton's ability to continue capturing nearly one-third of the U.S. fiber market, should push U.S. mill use higher in 1997/98. However, stronger competition from manmade fibers, particularly polyester, whose price fell to a 9-year low in January, will likely limit cotton's potential in 1997/98. In addition, domestic consumption of all fiber products fell in 1996 for the second consecutive year. If this trend continues, cotton mill use may fall short of the 50-year high experienced in 1994/95.

Nevertheless, both mill use and exports are seen higher in 1997/98, with total demand for U.S. cotton projected to expand 4 percent to 18.2 million bales, similar to the average of the 1993/94-96/97 marketing years. U.S. production can easily satisfy this level of demand with only average acreage and yield in 1997/98. These two factors, of course, will play a major role in determining available supplies next season.

Planted acreage in 1997 will be influenced by the farm program changes that began with last year's crop. Prior to 1996, cotton plantings were determined by a complex combination of program and market incentives and restrictions. Under the new legislation, there are no restrictions on planted acreage and payments to producers are not related to either planted acreage or market prices.

Distinct patterns in U.S. upland cotton acreage can be seen on a regional basis. While USDA is not forecasting regional cotton area at this time, a look at the past decade shows some general trends in total acres planted and idled in each region. Area, which once moved westward, is returning to the Southeast and Delta regions at the expense of the Southwest and West regions. Improved insect control programs and higher relative net returns for cotton versus other crops encouraged this movement. However, with the new market-oriented farm program in place in 1996/97, all regions experienced area declines from the preceding year, as competing crop prices enticed acreage away from cotton. Also, the income effects of high production costs and low yields in 1995, due to weather and insect damage, provided additional decreases in 1996 cotton area.

The difficulty of separating the effects of market and policy variables on 1996 acreage complicates the task of projecting 1997 area. Market indicators are, on balance, more favorable to planting cotton this spring than they were a year ago. On the other hand, with a reduction in the government program safety net, some producers may maintain a shift to grains, which have lower production costs and more reliable yields. Anecdotal information and, in particular, the acreage survey recently published by the National Cotton Council, suggest that cotton producers will decrease acreage in 1997 by 7 percent.

Recent market information suggests that cotton area may not decline as much as first anticipated. The corn/cotton and soybean/cotton price ratios have declined, and most producers experienced better returns from their 1996 cotton crop than from their 1995 crop. While industry estimates for 1997 cotton acreage range from 13.6 to nearly 15 million acres, USDA is currently projecting cotton planted area at 14 million

acres for 1997, about 4.5 percent below 1996 plantings. The projection includes 13.8 million acres for upland cotton and 240,000 for ELS cotton. The extent of cotton area reductions will likely vary by region but will be based on expected net returns and producers' assessment of relative risk.

While cotton planted area may fall to 14 million acres in 1997, a return to a lower, more normal abandonment would keep harvested acreage above that of the 1996/97 season. If the abandonment rate is near 6.5 percent, harvested area based on the scenario presented here would total 13.1 million acres, 2 percent above 1996/97. Yields, however, are projected to decline from the 1996 U.S. record of 709 pounds per harvested acre. The preliminary yield projection for 1997/98 is 675 pounds per harvested acre, which is near the long-term trend yield.

Based on these acreage and yield assumptions, U.S. cotton production in 1997 would total 18.5 million bales, approximately 2.5 percent below the 1996/97 crop. Upland production is projected at 18 million bales, while ELS output accounts for the remaining 500,000 bales. Coupled with the current beginning stock estimate of 4.45 million bales, total U.S. cotton supplies next season would reach 23 million bales, 1 million above 1996/97 supplies and the second highest U.S. cotton supply level in the last 30 years.

With U.S. cotton production projected in excess of the expanding domestic and export markets, U.S. carryover stocks in 1997/98 would rise nearly 8 percent to 4.8 million bales. This implies a stocks-to-use ratio of 26 percent, which reflects ample U.S. stocks to bridge the gap until new-crop cotton becomes available in the fall.

Summary

In summary, cotton will continue to compete with alternative crops for area here in the United States and abroad. Supply and demand changes, and the price response that these changes provide, will indicate the acreage planted in a given year. And once the fiber is produced, cotton will be competing with other fibers, like polyester, at domestic mills and on the world market in the form of raw fiber or cotton textile and apparel products.

Growth in demand will be the key to the continued success of U.S. cotton, with textile and apparel exports playing a key role in helping to extend the growth in U.S. consumption. But, polyester also will likely remain very competitive among the manmade fibers.

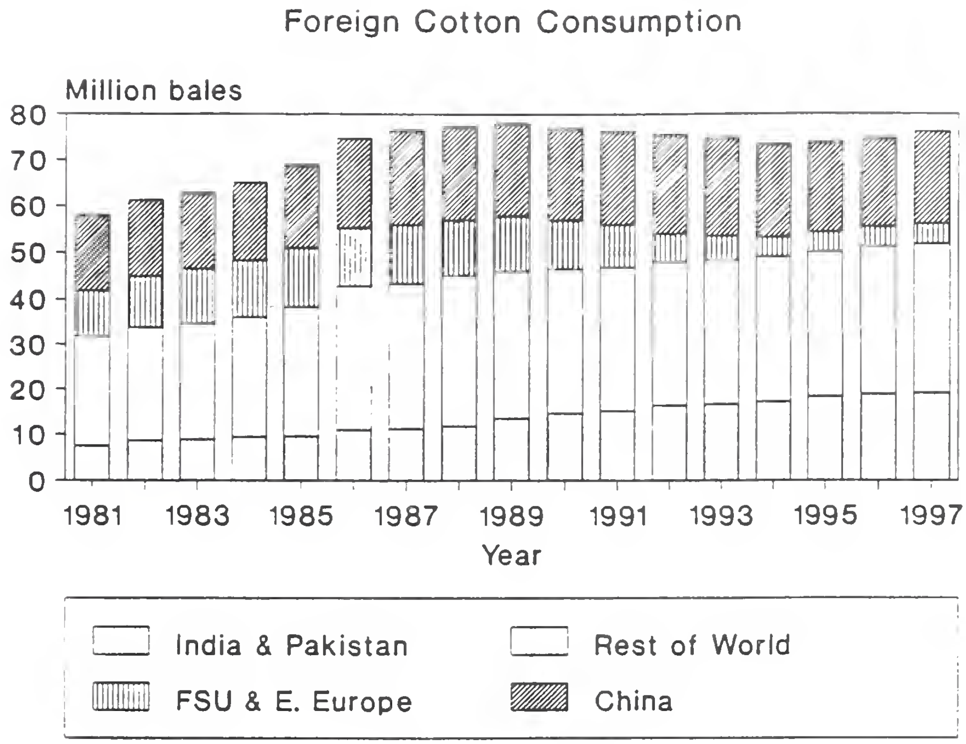
I would like to reiterate that the projections presented here are based on information and data as of February 1997. These projections will inevitably change as more information becomes available. The National Cotton Council recently provided a benchmark of farmers' intentions as of early January and NASS will provide the results of its upcoming *Prospective Plantings* survey at the end of March. While the Farm Act now allows producers to have the final say in what actually gets planted to cotton, "Mother Nature" ultimately will still determine h
ow much cotton is actually produced.

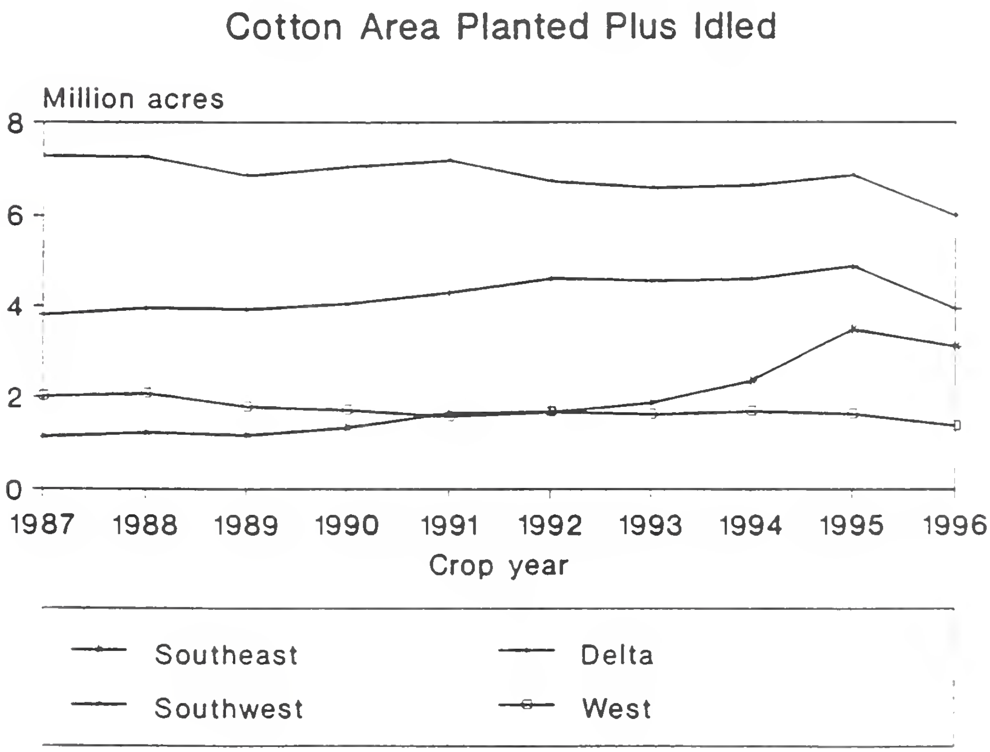
1996/97 U.S. HIGHLIGHTS

- Beginning Stocks -- lowest in 5 years.
- FAIR Act -- first year of new market-oriented farm legislation.
- Record Yield.
- Production -- second largest on record.
- U.S. became largest cotton-producing country -- a first in 15 years.
- Large imports -- second consecutive year.
- Demand -- declining for second consecutive year.
- Ending Stocks -- rising to a more normal 25 percent stocks-to-use ratio.

1996/97 FOREIGN HIGHLIGHTS

- Beginning Stocks -- highest in 10 years.
- Production -- below 5-year average.
  China, FSU, and Pakistan down more than 15 percent.
- Consumption -- equal to 5year average.
  India, Pakistan, and Turkey continue high growth rates.
- Imports -- relatively stable.
  Asian Markets decreasing, while Latin American increasing.
- Exports -- highest in 5 years.
  African Franc Zone, Australia, and Argentina expanding, while FSU declining.
- Ending Stocks -- down 4 percent. Excluding China down 8 percent.


Foreign Cotton Consumption
Million bales
80
70
60
50
40
30
20
10
0
1981
1983
1985
1987
1989
1991
1993
1995
1997
Year
India & Pakistan
Rest of World
FSU & E. Europe
China


Cotton Area Planted Plus Idled
Million acres
8
6
4
2
0
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
Crop year
Southeast
Delta
Southwest
West

EXPORTING COTTON IN AN UNCERTAIN MARKET

Allen A. Terhaar
Executive Director
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Although it seems like only yesterday, from what I can tell it appears that it has been 15 years since I last spoke to a USDA Outlook conference. At that time I was working as an economist with USDA's Foreign Agricultural Service in the grains complex, and made one of those fairly predictable supply and demand presentations about what went up and what came down during the course of the year.

I do not plan to do that today. In the instructions to speakers for these sessions, the Program Planning Committee stated that it was "interested in obtaining independent views of future trends and issues". I am going to go out on a limb to make some predictions today that are meant to stimulate discussion. They are, indeed, independent and personal views and in no way are meant to represent the official outlook of the National Cotton Council or Cotton Council International.

When it comes to cotton's role in the world market for the next 5 years or more, some outcomes are as predictable in my mind as the Lunar Eclipses that Herman Kohlmeyer will tell us about at lunch. Other developments are about as difficult to forecast as the prices that Mr. Kohlmeyer will also tell us about.

Here are some of my predictions:

1. Cotton will continue to gradually lose market share in the world fiber markets.
2. Trade in raw cotton will lose share to processed cotton product trade.
3. A continued shift will occur in cotton spinning, fabric formation and garment assembly from more developed to lesser developed economies, **except in the case of** the United States.
4. Cotton's fortunes will depend on establishing itself as a premium fiber, not a bulk product for the masses.
5. Technical developments in cotton fiber characteristics, quality identification and preservation, high-speed processing and new product development will play an even more important role in the future than in the past.

6. Wider swings in cotton production will occur worldwide in the next 10 years because of more intense competition with food crops than we have in the past 10 years.

I will only elaborate on a few of these predictions today.

Prediction (1): Cotton Will Lose Market Share

In my opinion we, as an industry, are still paying too much attention to what is happening with cotton supply and demand factors within the United States or even the cotton complex worldwide, and too little attention to the broader question of how cotton fits into the total world fiber equation and what factors will determine its long-term fortunes.

The main issue today for cotton globally is how it competes -- or does not compete -- within the overall fiber complex. The key variable in that complex is man-made fibers, particularly polyester.

World fiber consumption has increased dramatically since 1984. Total fiber use rose from 138.5 million bale equivalents in 1984 to an estimated 187.7 million bales in 1996. This is a 36% increase in fiber consumption in just 12 years -- a very positive fiber use growth that would indicate a solid expansion opportunity for cotton.

Unfortunately, world cotton consumption reached a peak in 1989 at 87 million bales, and by 1996/97 is projected by the ICAC to be 87 million bales, unchanged from the record of 1989.

The dissolution of the FSU had a profound effect on world cotton prices but also affected the incomes and purchasing ability of consumers in those republics. In the late 1980's the FSU was using 10.1 million bales of cotton. Recent estimates put FSU annual retail purchases of cotton at around 5 million bale equivalents. Retail purchase of man-made fiber experienced a similar reversal. Excluding the FSU, world retail cotton purchases have increased 4.5 million bale equivalents since 1989, with the U.S. accounting for 90% of the non-FSU change.

Excluding the FSU, since 1984 the world has added 19.2 million bales to annual cotton use. In fact, the Western Hemisphere has accounted for 11 million of those bales. The purchase of cotton products is concentrated in several large markets. North America, Latin America and Europe account for more than one half of all the new cotton purchases since 1984. The rest of the world, with its large population base, has added only 8.2 million bales.

In contrast to cotton, man-made fiber consumption in Asia has grown rapidly over the same period adding 32.3 million bale equivalents. This growth has accounted for fully 89% of the 36.3 million bales increase in world man-made fiber use. Man-made fiber consumption in the Western Hemisphere has grown only slightly in the past 12 years.

Asian consumer markets are widely expected to be the fastest growing fiber markets for the next ten years given current forecasts of GDP growth rates. Unfortunately, those same Asian markets are undergoing shifts in consumption from cotton to man-made. China, Pakistan and Bangladesh have seen steady growth in man-made fiber use while cotton has experienced a modest decline. The ASEAN market displays an even more striking increase in man-made fiber use.

Obviously, if total fiber consumption continued to increase while cotton consumption remained flat, world market share for cotton has slipped -- and my prediction is that it will continue to slip.

In most of the 1980's total annual consumption of man-made fiber and cotton were essentially equal. After 1990, man-made fiber use increased while the volume of cotton used annually remained largely unchanged. Among the man-made fibers, polyester was the moving force bringing growth in consumption. Increases in polyester use explain virtually all of the changes in man-made fiber consumption.

In fact, during the past five years a significant shift in the pattern of world fiber consumption has emerged. Between 1990 and 1995, polyester use grew 6.8% per year while cotton use barely changed. Several projections for the next five years place annual growth in polyester use at 7% while cotton increases at 1.3%.

What is happening in the man-made fiber arena? An explosion in production capacity began several years ago, mostly located in the Far East. In 1990, world synthetic fiber production capacity was 78.9 million bale equivalents, with 43% located in the Far East. Projections for the year 2000 put capacity at 140.5 million bale equivalents and the Far East possessing 60.8% of all production. If these expansion plans are realized, as NCC's Dr. Mark Lange pointed out, the Far East will have greater synthetic fiber production capacity in the year 2000 than the entire world capacity was in 1990.

The textile industries of China, Pakistan, India, Indonesia and other players in the region are crucial economic and social industries. As many as 100 million Indians are reportedly involved in the hand-loom and textile industry. Pakistan's largest export earner continues to be textile products, accounting for 60% of all foreign exchange earnings. These countries are concerned with providing adequate fiber supplies to these important industries.

Will further expansion of man-made fiber capacity take place? Almost certainly. Even though a some of the man-made capacity investment decisions were made in 1995 when cotton was trading at $1.15 per pound and polyester was $0.93 and prices for both are currently much lower, information on the cost of production for polyester in Asian markets indicates a break-even price in the range of 40 to 45 cents, or 50 to 55 cents per pound mill-delivered in Asian markets.

A number of textile producing countries, notably China, India and Indonesia have official policies to foster the development of man-made fiber production and to increase its relative share vis-à-vis natural fibers. In their view, when looking at the importance of the textile industry to their local and export economies, and looking at the burgeoning food demands of their populations, there is really little choice. As you are aware, in each of these major economies, government direction bears more weight than in more open economies.

Hence, my prediction that cotton will continue to lose market share for the next decade. The forecast is that cotton consumption will grow to 97.4 million bales by 2004. Man-made fiber use is currently estimated at 102.7 million bale equivalents and will grow to 121.7 million bales equivalents by 2004. These estimates place cotton's market share at 44.5% in contrast to 45.6% for 1996. I think that forecast market share may be optimistic.

Prediction (2): Trade in raw cotton will lose share to processed cotton product trade.

This is less a prediction than an observation of a trend that has been underway for several years now.

Examining the world cotton trade statistics for a trend, it is pretty hard to find one. In general, it would seem to be downward sloping over the longer term, with individual country shares depending on local production and the relative strength of domestic and overseas demand.

Superimposing world trade in cotton products on raw cotton trade, however, shows a definite trend toward trade in cotton textile products, and that trend has been going on for some years.

Looking more closely at the U.S. as an example, with the increase in U.S. cotton production in recent years (two of the last three being record production), this has translated less into an increase in raw cotton exports than into the further growth of value-added cotton yarn, fabric and finished good exports.

Are other countries undergoing a similar transition? Yes, Pakistan is another good example of this phenomenon.

Will the trend toward increased exports of value added cotton continue in the U.S. and elsewhere? Yes, with the possible exceptions of Australia and Argentina/Paraguay.

Whereas the processing of Central Asian cotton used to be done everywhere in the Soviet Union **but** in Central Asia, and is now done everywhere in the **world** but in Central Asia, you are already beginning to see investments in those countries that follow the Pakistani example. In other words, before too many years have gone by, we are likely to see Uzbekistan concentrating on yarn and fabric exports, and not as heavily on raw cotton exports.

It is interesting to note that this trend has not been nearly as evident in Argentina/Paraguay, but the picture could look quite different if we look at Mercosur as the region for processing and exporting Argentine cotton. With the addition of Brazil's huge cotton processing capacity, that region begins to look more similar to what is happening in the U.S., Pakistan, India and others. Only Australia may be left as the continent or subcontinent which will not see a major shift from raw cotton exports to value added cotton product exports.

Prediction (3): A continued shift will occur in cotton spinning, fabric formation and garment assembly from more developed to lesser developed economies, **except in the case of** the United States.

This prediction is related to the previous one in that most of the world's cotton producers, except the U.S. and Australia, are developing countries. The world's current top ten cotton producers are: U.S., India, Uzbekistan, Australia, Egypt, China, Pakistan, Turkey, Argentina, and Greece.

The shift of spinning, weaving and garment manufacture from developed to developing countries has been going on for generations already. The interesting thing is that the reverse seems to be taking place in the United States. To understand first of all why cotton processing is on the move, one should first look at what we call the industry life cycle. I will use the example of Korea.

Korea used to be somewhat of a cotton producer, and its citizenry relied mainly on natural fibers for their minimal fiber needs before Korea began intense industrialization. Once industrialization

began, Korea made textiles and textile exports a cornerstone of that industrialization, with a dramatic impact on its imports of raw cotton. Gradually, however, Korea -- like Japan, West Europe, and the United States -- began to run up against increasing costs of labor in particular, but other rising costs as well. Furthermore, virtually all of the cotton fiber as an input needed to be imported. Korea's textile industry began to lose competitiveness, exports dropped off, and Korean mills began to invest in Southeast Asia, Central America and, more recently, China.

Still, to come to the conclusion that Korea is a "has been" for cotton imports would be an incorrect conclusion. While raw cotton imports are certainly down and are likely to continue to decrease over time, Korea's imports of cotton yarn, fabric and finished goods is rising rapidly -- some of those imports coming from Korean mills that are now located offshore.

I have attempted to categorize countries according to where I see them fitting on the cotton industry life cycle chart. This was not a rigorous process, but a categorization that alerted me to the fact that we at Cotton Council International may need to treat markets differently depending on where they are on this industry cycle. Further definition is probably a good project for some economics graduate student.

Interestingly, China, until recently the world's largest cotton producer and the largest cotton processor, last year became a net cotton product importer. This is certainly like carrying coals to Newcastle! As when it occurred historically in the United Kingdom and elsewhere, the shift of the cotton processing industry inexorably marches on.

So, what makes the U.S. different?

Two factors. One is that our textile industry has invested somewhere on the order of $2 billion per year for the past couple of decades in new technology and product development. The U.S. cotton textile processing industry can now count itself among the most efficient and low-cost in the world at least through the fabric stage, and probably all the way through the cut-piece stage.

Thus, the U.S. textile industry can compete, particularly in this hemisphere, with anyone. If we add to this U.S. competitiveness the proximity of low-cost sewing platforms in Central America and the Caribbean, the United States is globally competitive through the final product stage.

Couple this competitiveness with a reliable, quality and year-round available supply of almost any cotton type a manufacturer might want, and you have a situation where the United States is likely

to be the only developed country that bucks the trend toward migration of textile processing to developing countries.

Prediction (4): Cotton's fortunes will depend on establishing itself as a premium fiber, not a bulk product for the masses.

This prediction keys off on what is happening with man-made fibers, and gets to the heart of what Cotton Council International does.

Most of you are very familiar with the consumer promotion work of Cotton Incorporated here in the United States through the "Fabric of Our Lives" campaigns. U.S. producers and Cotton Incorporated can justifiably take much credit for and pride in the fact cotton's market share in the United States is at its highest point in 30 years. In the past 10 years alone, per capita U.S. consumption of cotton has increased by nearly 50 percent.

As we already saw from my previous comments, cotton has not met with similar success outside of the U.S.

Why? I think Cotton Incorporated's Dr. Berrye Worsham summed it up best in the following comment:

> "A primary reason for the disparity in growth between the U.S. market compared with foreign markets is the fact that the U.S. market for fiber is largely driven by the consumer while fiber economics play the dominant role in markets abroad."

There is no way that cotton can compete on a price basis with 45 cent polyester! The fact is that cotton should **not even try** to compete with polyester on a price basis, but on a quality basis instead.

The previous challenge to cotton from man-made fiber 30 years ago was quite different from the current situation. Regardless of how performance ultimately turned out, man-made fiber initially had an allure as a new product with fashion statements, new product characteristics, new styles and new handling. In fact, polyester sold at a premium to cotton during part of that period.

This current challenge is largely price based.

We should not be discouraged, however. I believe there is an excellent opportunity for cotton to be a highly profitable crop here in the United States. It means marketing our product as a premium product -- not as a bulk commodity. Indeed, we have seen that happen the last couple of years as the U.S. price has exceeded the world average price by several cents, and U.S. cotton moving strongly into domestic and export markets.

From the consumer side, there is also hope. One of the themes we use in CCI's COTTON USA consumer promotion campaigns is that "Man Always Returns to Cotton". When you talk with consumers who can afford it in almost any country, their preference is for natural fibers, with cotton high on the list. The importance of cotton in the American cultural image (jeans, T-shirts, sportswear, etc.) adds fuel to this preference because of the penetration of this American "casual culture.

That is as much true in places like Europe and Japan, as it is in Brazil, China or Indonesia. The main difference between the former countries and the latter is that the bulk of the population can afford cotton products.

There appears to be a normal cycle that countries undergo as they move through the economic development cycle. During the subsistence agriculture and very early stages of development, natural fibers (cotton, wool, linen) tend to predominate because that is all that is available. As countries move up the development curve, consumers tend to switch to synthetic fibers because they are perceived to be modern, because they are durable (though not necessarily comfortable) through harsh wear and wash conditions, and they are low-priced.

Further up the development curve the consumer can afford to focus on fashion and comfort, and cotton excels at meeting these desires. At that point, we have the opportunity bring man (and woman) back to cotton -- and that is the consumer that our COTTON USA program is targeted at overseas.

This theory of the "life cycle of fiber demand" is another good project for a graduate student. In the meantime, there is hope that this resurgence of cotton in more developed markets is already occurring -- it needs fostering as it did here in the U.S. through Cotton Incorporated's successful efforts. That's why we feel it is highly important to maintain public sector/private sector export promotion programs such as USDA's MAP and FMD programs.

We cannot become complacent, however. Cotton is a natural fiber, a wonderful product that has improved its general fiber quality considerably during the past decades. But so has man-made fibers.

Which leads me to my next prediction --

Prediction (5): Technical developments in cotton fiber characteristics, quality identification and preservation, high-speed processing and new product development will play an even more important role in the future than in the past.

This is a prediction that I will leave to the technical experts, of which there are a number in this conference and certainly abound in the U.S. textile industry, Cotton Incorporated and the National Cotton Council.

For my supporting documentation for this prediction, I will only quote Mr. Andrew MacDonald of Brazil's Alpargatas Santista Textile company, a huge cotton user and a good customer of U.S. cotton. Mr. MacDonald, who is also chairman of the ITMF Spinners' Committee, said in a speech to this year's Beltwide Cotton Conference:

> "The textile industry battles against rising costs but, with stable textile prices, the industry must look for productivity to defend the bottom line -- which means faster and faster, low-labor machines. This in return increases the percentage participation of cotton in the final cost. Now, if cotton cannot handle the high speeds required which, by the way, the modern synthetics can, then the migration will eventually be away from cotton, despite the popular belief as regards comfort and ecology."

The message -- clearly that cotton technology in all its forms will be ever more important to maintaining cotton's competitiveness as we move into the 21st century.

Prediction (6): We will see wider swings in cotton production worldwide in the next 10 years because of more intense competition with food crops than we have in the past 10 years.

This prediction, in many ways, has already been dealt with amply throughout this Outlook Conference. With the passage of the FAIR Act of 1996, the rules of the game changed for U.S. cotton producers, and for producers worldwide. We are now in an environment where crops will much more readily shift from one year to the next based on costs and prices.

I only want to add to that debate that the secular shift that seems to have occurred **away** from cotton production in many of the world's minor producers will continue to be replaced by increases in the world's major producers such as the U.S., Australia, Argentina, India, Pakistan,

China and even Uzbekistan. The first three of those countries will react quickly and readily to price changes and alternative crops. The latter three will be battling rapidly increasing needs for food crops and a dwindling supply of good arable land.

The market will determine the production response.

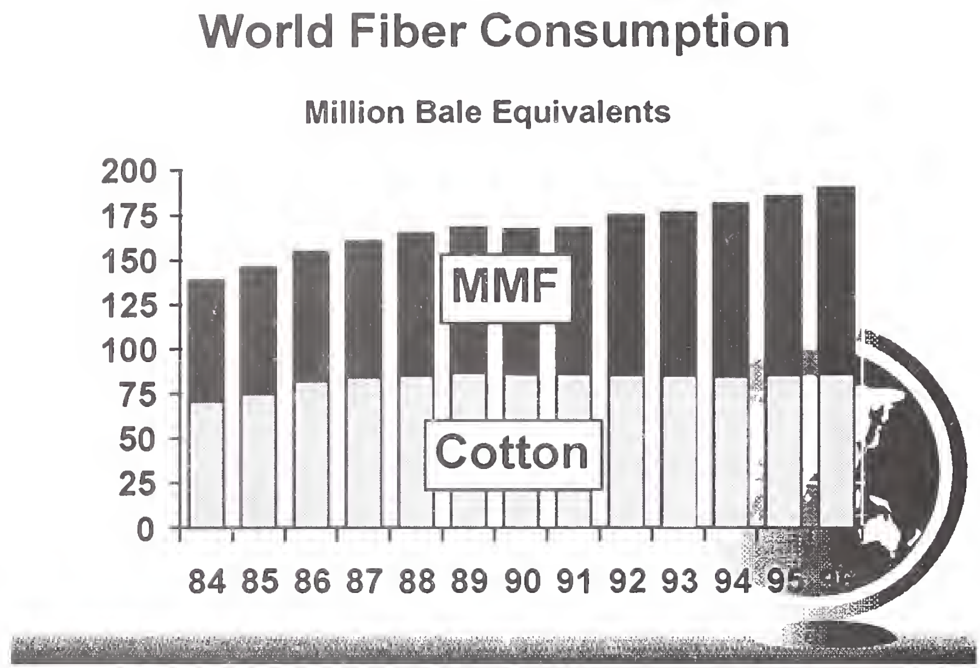
What about domestic mill use?

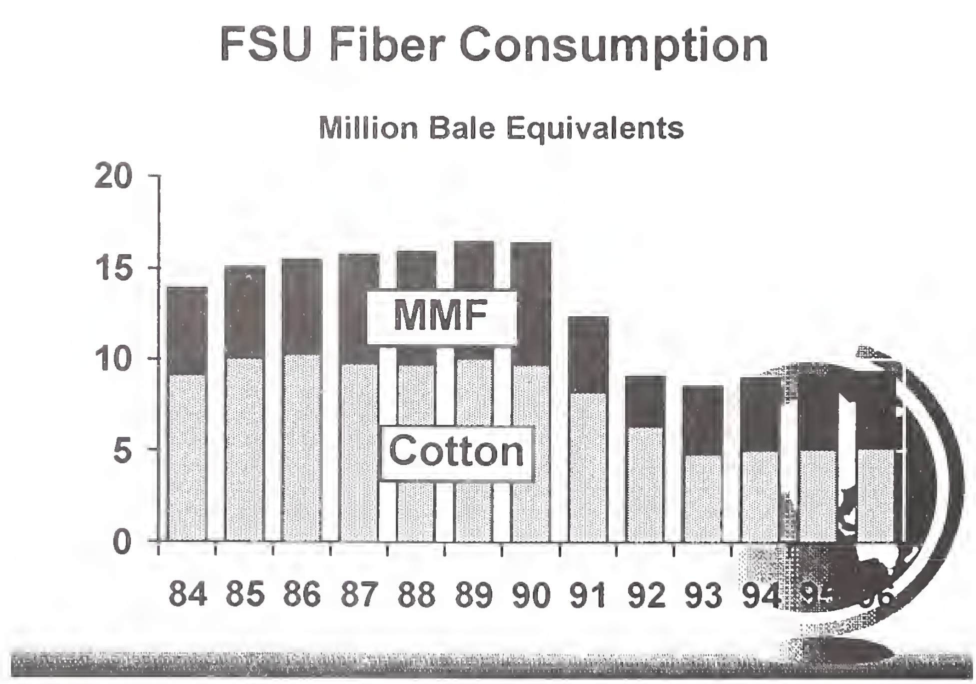
NCC's Dr. Mark Lange the following prediction at the Beltwide conference:

> "If we can begin to see successes in the reduction of production cost in the U.S. then I think U.S. mill use could easily rise to 15 to 16 million bales in use by 2004. Taking advantage of the close proximity of low cost assembly in Latin America coupled with our high quality just-in-time yarn and fabric production we can supply product that moves from here to Latin America and then to world markets."

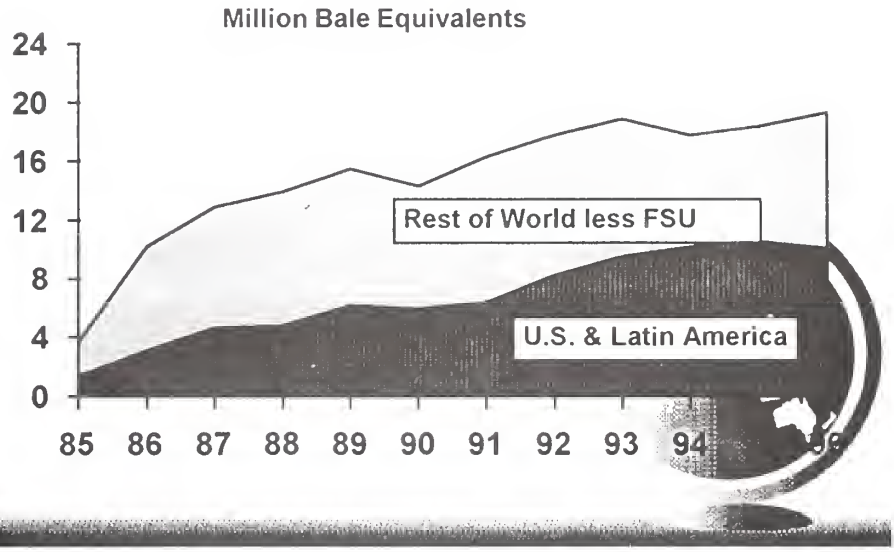
After many years of working in the grains area, I have the benefit of being a relative new-comer to the fiber side of the food and fiber equation. If my predictions pan out, we can chalk it up to beginners luck.

* This paper draws heavily on a presentation made by Dr. Mark Lange of the National Cotton Council at the January, 1997 Beltwide Conference.

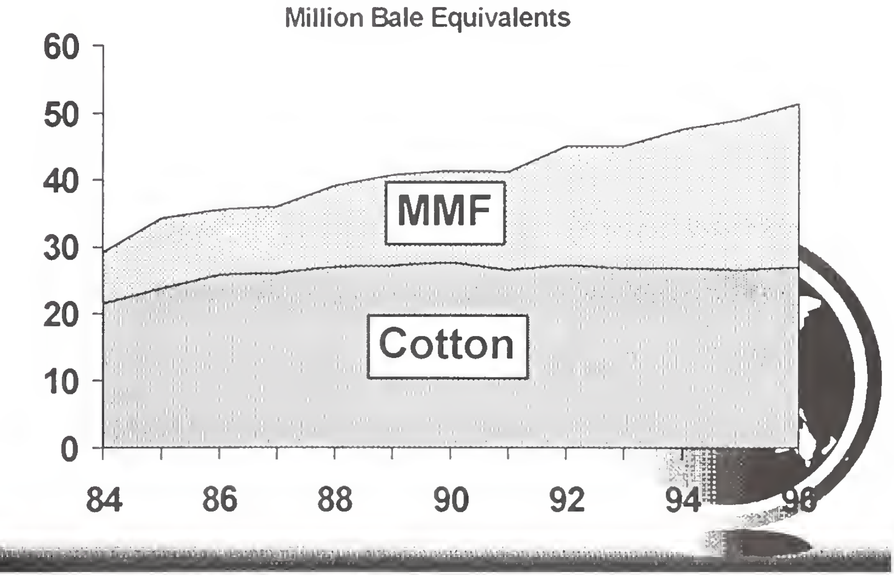

World Fiber Consumption
Million Bale Equivalents
200
175
150
125
100
75
50
25
0
MMF
Cotton
84 85 86 87 88 89 90 91 92 93 94


FSU Fiber Consumption
Million Bale Equivalents
20
15
10
5
0
MMF
Cotton
84 85 86 87 88 89 90 91 92 93 94

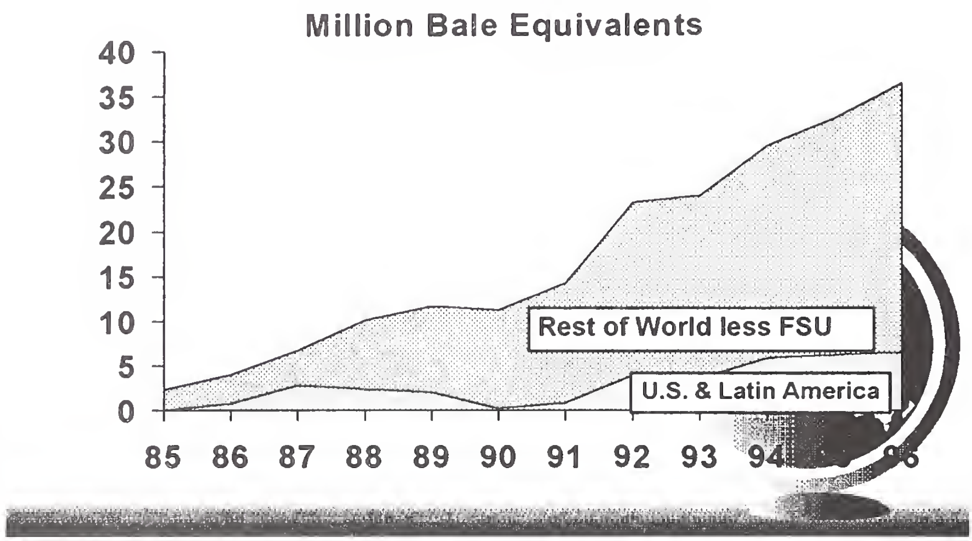
Annual Addition to Cotton Use Since 1984



ASEAN,China & Indian Sub. Fiber Use



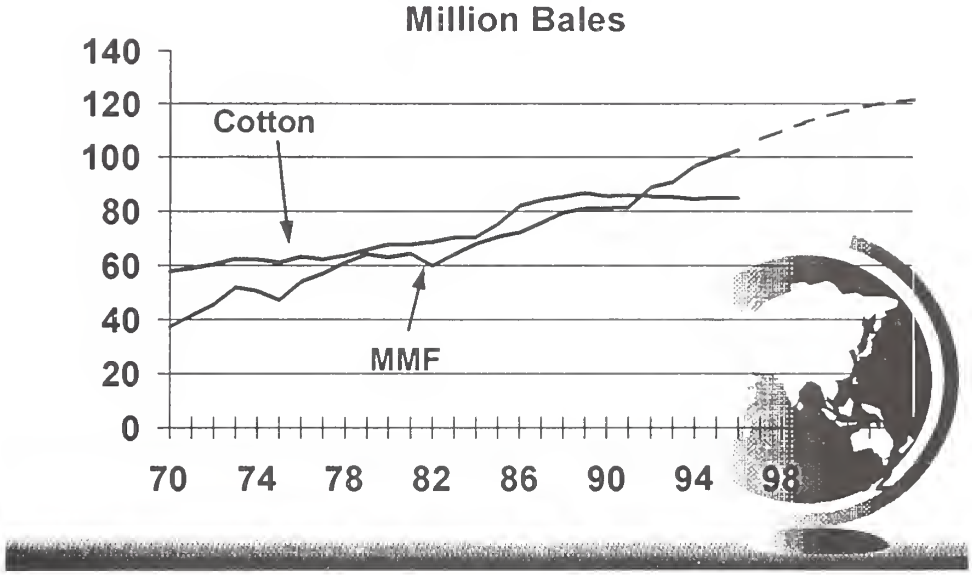
Annual Addition to MMF Use Since 1984



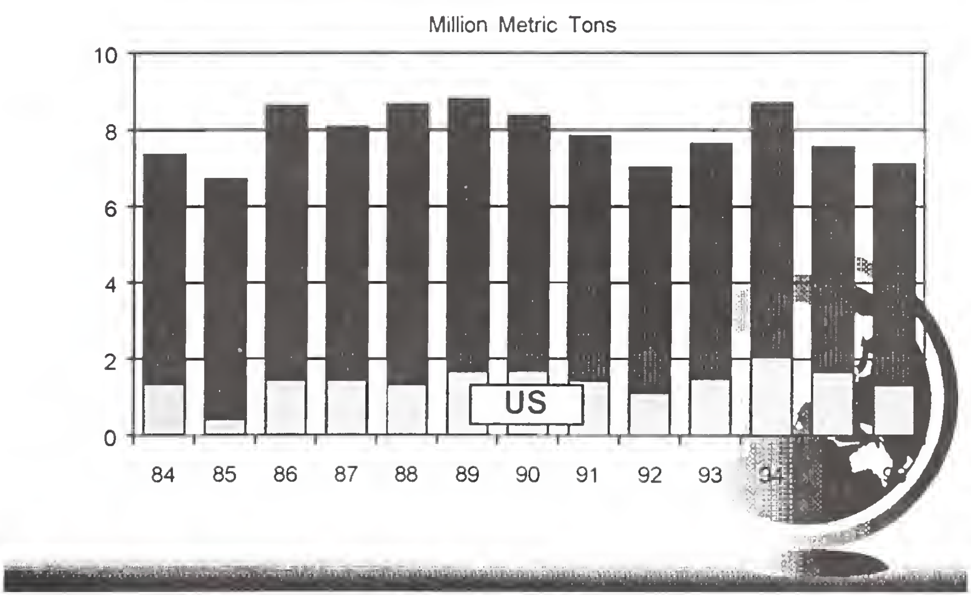
Synthetic Fiber Capacity
excludes cellulosic & polypropylene

	1990	1995	2000
Africa/M.E.	3.5%	4.0%	4.2%
Europe	27.3%	21.1%	16.3%
Americas	26.2%	22.9%	18.6[illegible]
Far East	43.0%	52.0%	60.8%
Mil. Bales	78.9	102.4	140.[illegible]

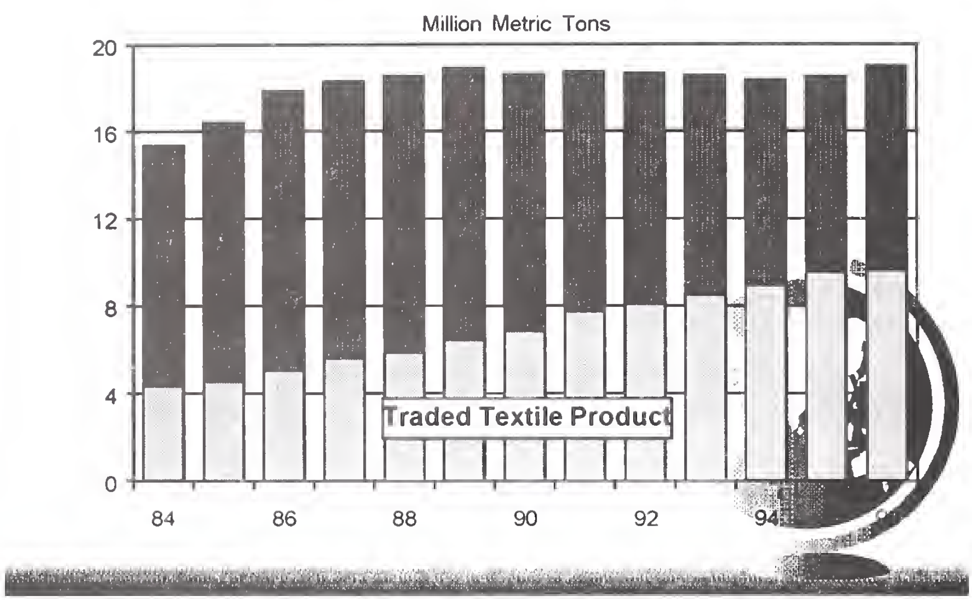
World Consumption of Fiber



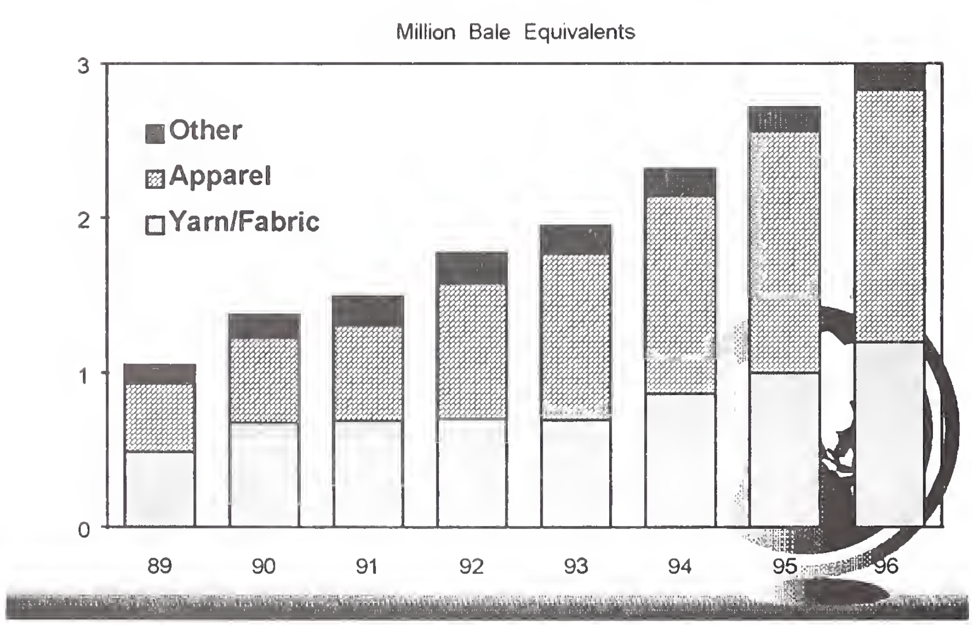
World and U.S. Cotton Trade



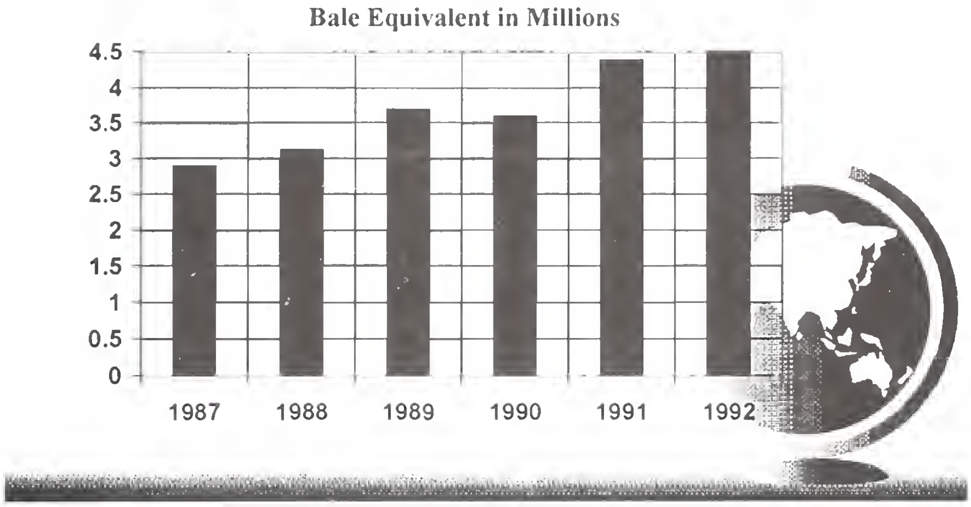
World Cotton Mill Use



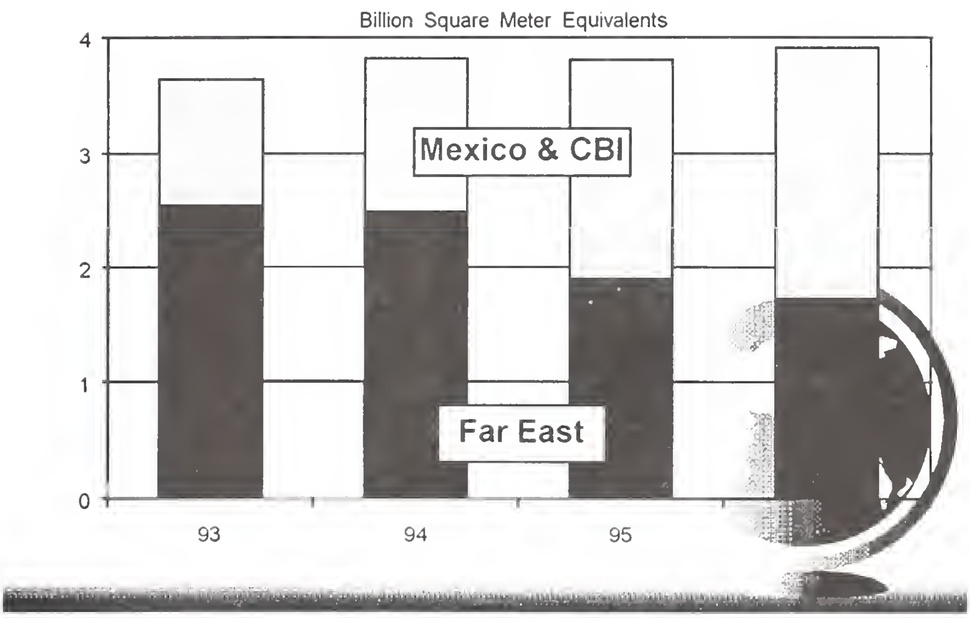
U.S. Exports of Cotton Textiles



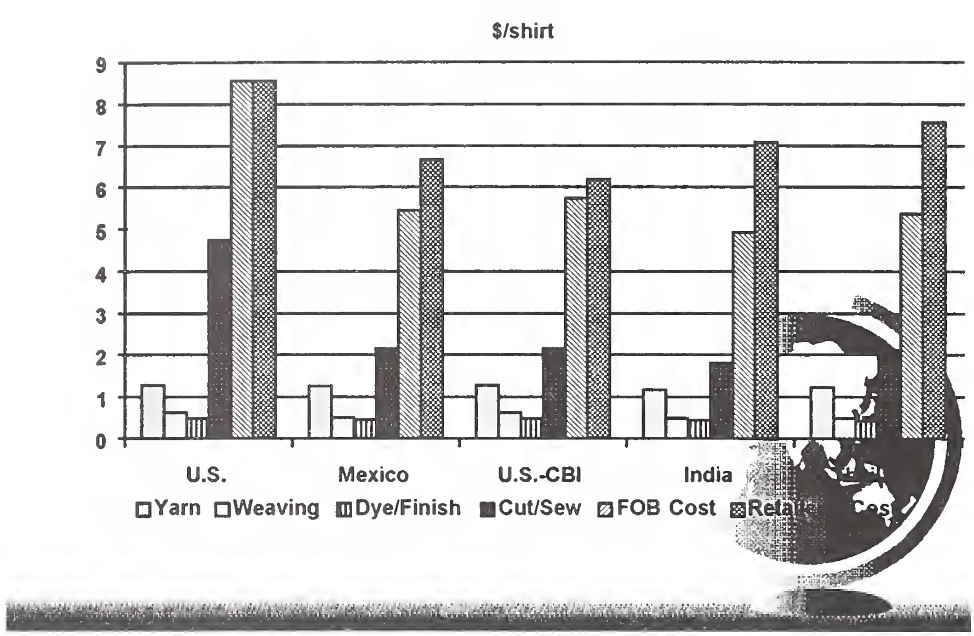
Pakistani Cotton Textile Exports to the World



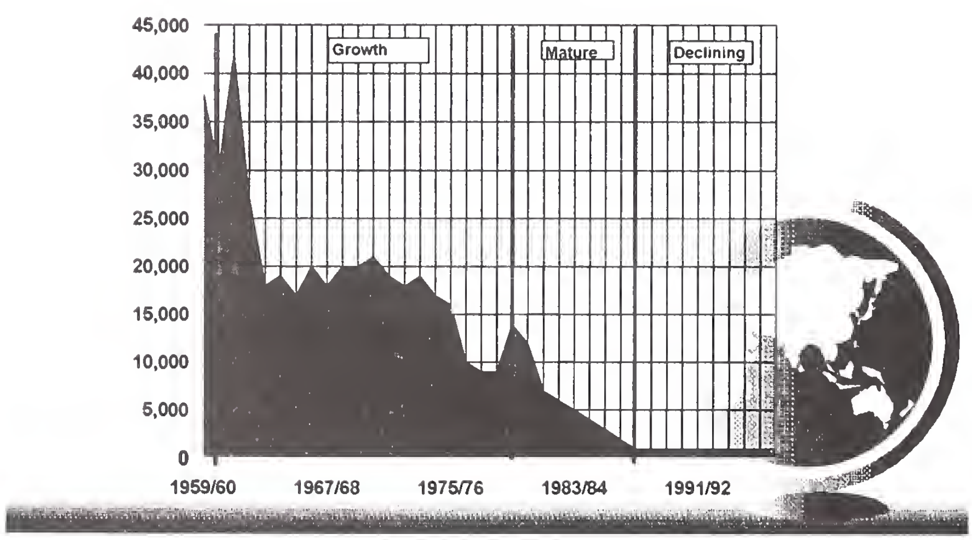
Cotton Textile Import Sources



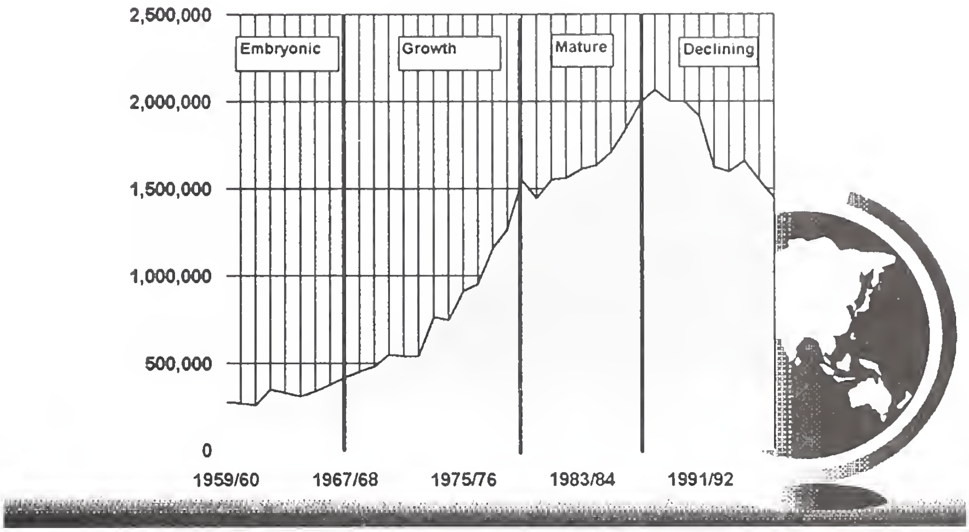
Costs Components for Men's Shirt



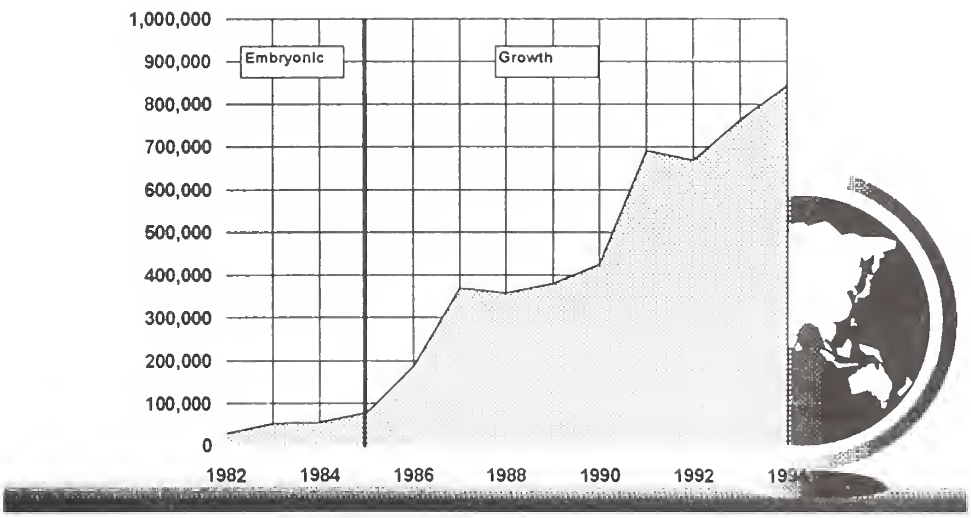
Korea: Cotton Production (bales)



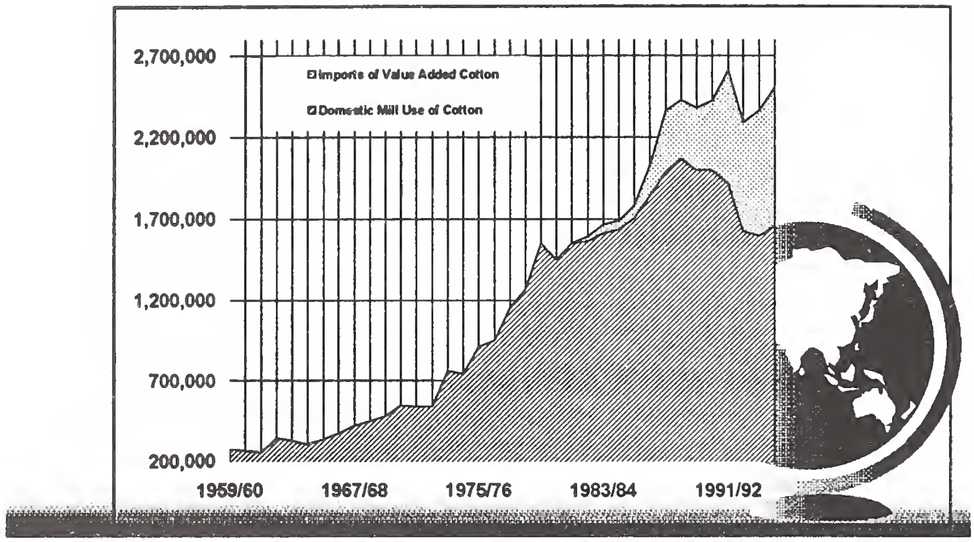
Korea: Domestic Mill Use of Cotton (bales)



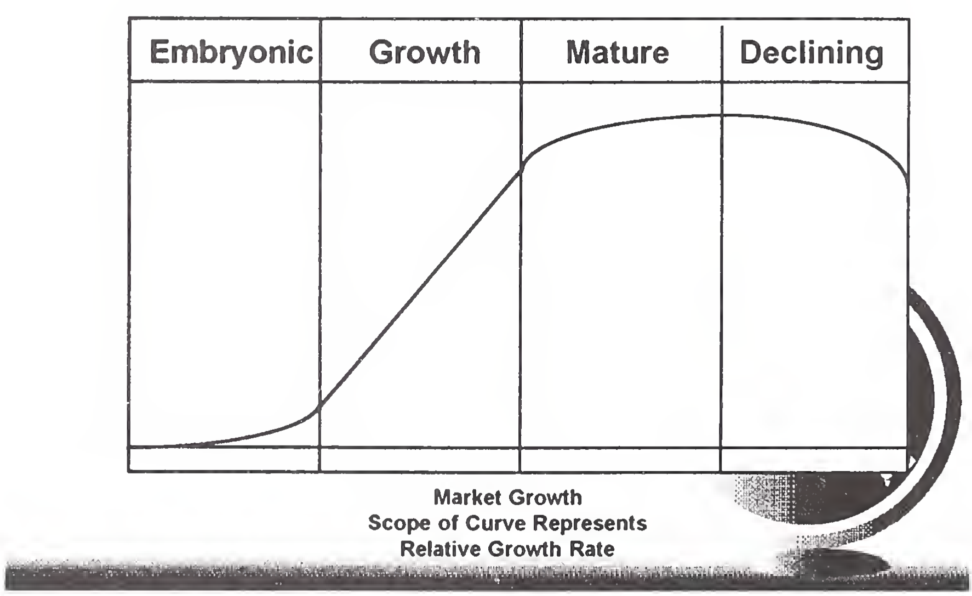
Korea: Imports of Value Added Cotton (bale equivalents)



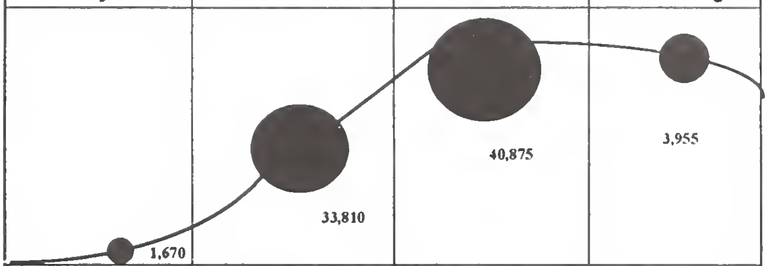
Korea: Imports of Raw and Value Added Cotton (bale equivalents)



Raw Cotton Industry Life Cycle

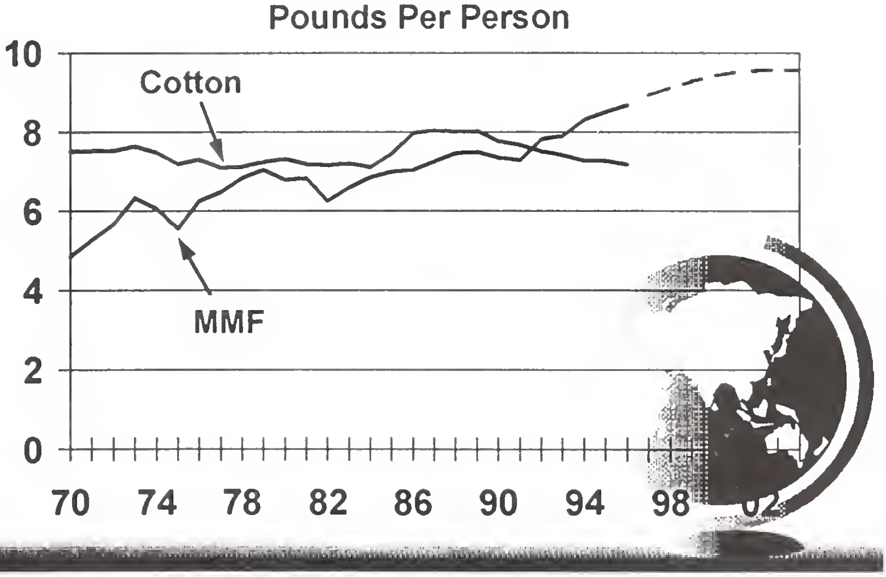


Raw Cotton Mill Consumption -- Life Cycle Distribution

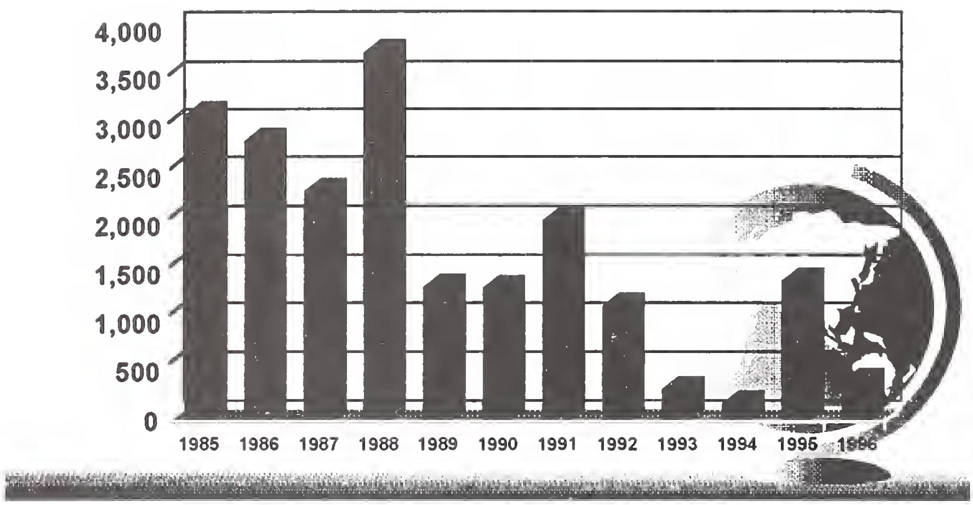


Embryonic	Growth	Mature	Declining
BURMA	PHILIPPINES	ITALY	JAPAN
VIETNAM	BANGLADESH	THAILAND	GERMANY
CAMBODIA	MEXICO	COLOMBIA	UK
SRI LANKA	BRAZIL	KOREA	FRANCE
MADAGASCAR	INDONESIA	POLAND	SINGAPORE
TURKMENISTAN	TURKEY	SPAIN	HONG KONG
KAZAKSTAN	MALAYSIA	VENEZUELA	GREECE
UZBEKISTAN	EGYPT	RUSSIA	
	ARGENTINA	PORTUGAL	
	INDIA	TAIWAN	
	PAKISTAN	U.S.	
	PERU	CZECH REPUBLIC	
	ROMANIA	CHINA	

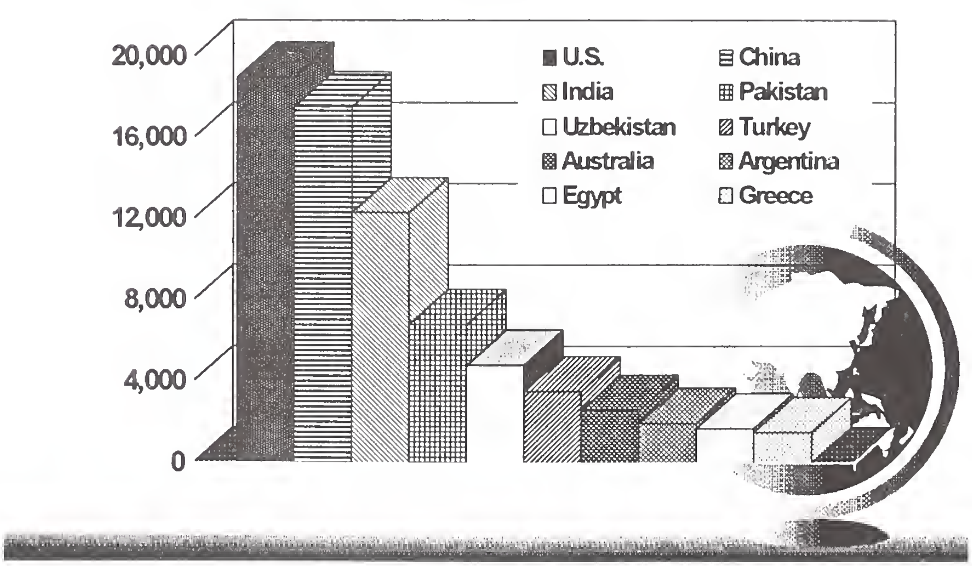
World Per Capita Consumption of Fiber



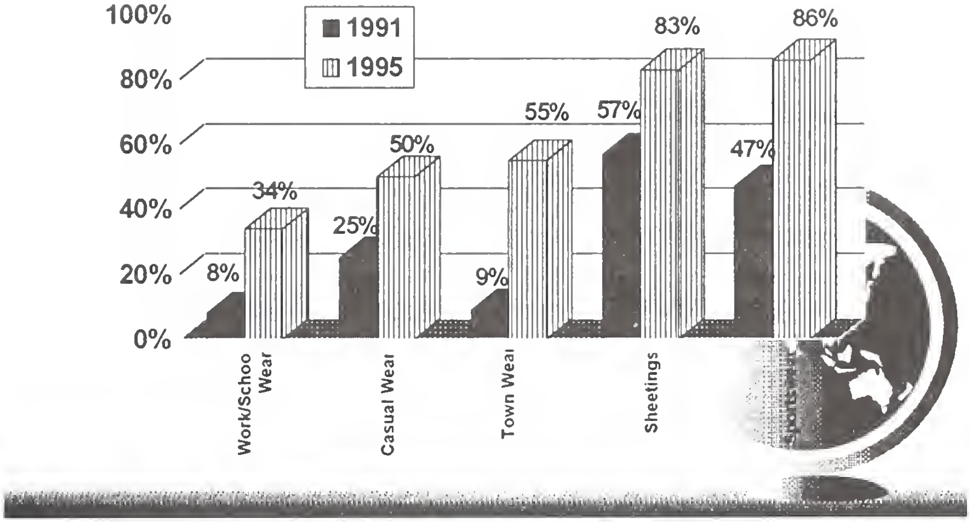
Pakistan Cotton Exports
(000's)



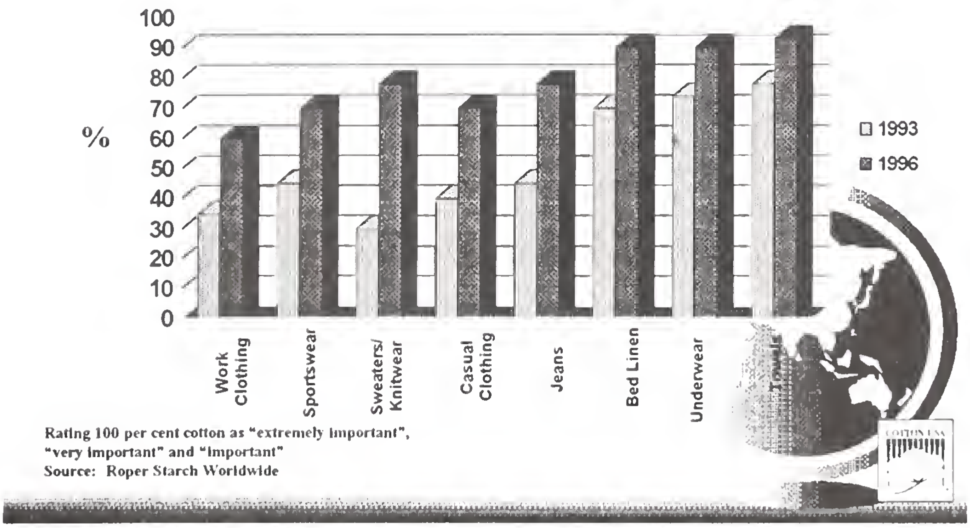
Top Ten Countries in Cotton Production
(000's)



Importance of 100% Cotton Content for Consumer Textile Purchasing
Korea



PURE COTTON'S PURCHASE IMPORTANCE EUROPE 1996 vs 1993



PRODUCING COTTON IN THE NEW POLICY ENVIRONMENT

by

Robert E. McLendon
Cotton Producer
Leary, Georgia

Thank you. It is certainly a pleasure for me to be with you today and to share with you what's going on down on the farm. I am a diversified row crop farmer from Leary, Georgia. Leary is located in Southwest Georgia, near Albany, about 80 miles north of the Georgia-Florida state line. In addition to cotton being my main crop, I grow peanuts, corn, soybeans, wheat and canola. I also grow broilers for a poultry processor, have a small beef cattle herd and a hog feeding facility. I began my farming career in 1974 and the crop acreages I planted every year was set by USDA at the direction of Congress if I chose to participate in the Federal Farm Program.

I was asked to talk to you today about "Producing Cotton in the New Policy Environment". Congress passed the Federal Agriculture Improvement and Reform Act of 1996 (FAIR) and it changed business as usual on the farm. Prior to the FAIR Act of 1996 or "Freedom to Farm", USDA determined the crop acreages that were needed to provide an adequate crop supply. The 1990 Farm Bill mandated a 30% stock-to-use ratio for cotton and USDA tried to set an ARK (set-aside acreage) that would accomplish this goal. The supply management or balancing act program took the wide swings out of supplies and prices. It is much easier for a farmer to survive with an average price than with wide fluctuations in prices. We do fine in the up markets, but we go out of business in the down markets.

Congress decided in 1996 that governments' role in agriculture should be reduced---both financially and regulatory. The FAIR Act of 1996 was passed and for the first time since 1933, the farmer had total control in determining the crop acreages to plant on his farm. Program payments were decoupled from production and my total production was eligible for Commodity Credit Corporation (CCC) loan. I think the Freedom to Farm Act of 1996 was the most dramatic change in farm legislation since the depression in the 1930's.

The farmers of Georgia and the Southeastern United States had flexed corn acreage to cotton prior to 1996. Georgia's cotton acreage increased from approximately 120,000 in 1983 to 1,500,000 in 1995. We are familiar with trying to determine the most profitable crop to plant, but we gave up the protection of Federal Agricultural programs prior to 1996.

On my farm, peanut acreage changes very little but I had to decide how many acres of corn,

THE OUTLOOK FOR FOOD PRICES IN 1997

Annette L. Clauson
Agricultural Economist, Economic Research Service, USDA

The Consumer Price Index (CPI) for food in 1996 increased 3.3 percent above 1995. This was the largest increase since 1990, when food was up 5.8 percent. The 1996 food price increase of 3.3 percent was slightly above the 3.0 percent increase for all goods and services.

In 1997, the CPI for food is expected to rise 2 to 4 percent above 1996. The away from home component of the CPI, which increased 2.5 percent in 1996, is expected to increase 2 to 4 percent in 1997. The higher Federal minimum wage, which went into effect fall 1996, had a minimal affect on the away from home index in 1996. While we were expecting some upward pressure in the away from home index, competition among the restaurants and fast-food establishments remained strong and prevented the pass-through of higher wage costs and raw material costs to consumers. The at home component of the CPI, which increased 3.7 percent in 1996, is also expected to increase 2 to 4 percent in 1997.

In spite of higher grain prices in 1996, there were four major factors holding food prices to the 3.3 percent increase. First, inflationary pressures, as measures by changes in the all items CPI, remained stable at 3.0 percent in 1996 and is forecast to increase 3.2 percent in 1997. This means that costs related to food production and marketing, such as labor, packaging, transportation, and advertising which account for about 75 percent of retail food costs, are not expected to increase substantially.

Second, the farm value proportion of the U.S. food dollar, has generally been declining, to about 22 cents in 1995, is expected to be about the same in 1996 and 1997. With a smaller farm value proportion, retail prices are determined less by farm commodity prices and more by market conditions for labor, packaging, and advertising, as well as by competition among firms.

Third, the trend of increasing economies of size in the agricultural sector is expected to continue. In general, larger and more specialized beef, pork, and poultry operations have led to slower rising per-unit production costs.

Fourth, the away-from-home food sector, including purchases primarily from restaurants and fast-food establishments, continues to grow. Purchases of food away from home accounted for 47 percent of total food dollars spent in 1995 and is expected to be about the same in 1996 and 1997. Expansion in this sector tends to lessen the impact of farm commodity price rises on the overall food price index. Changes in prices for away-from-home items are influenced more by developments in the non-farm markets (labor, packaging, transportation, and advertising) and by

competition among restaurants and fast-food establishments, than by increases in farm commodity prices. The away-from-home food market has been very competitive since the recession of the early 1990's.

In summarizing 1996 food price increases, higher grain prices reached during the spring of 1996 affected feed costs as well as retail prices in pork, poultry, eggs, dairy products, and cereal and bakery products. Because these food categories account for over a third of the at-home food dollar, price changes for these items have a significant impact on the at home CPI. Although retail prices increased for most food categories in 1996, prices also fell for three food categories--beef and veal, fresh vegetables, and nonalcoholic beverages.

- **Beef and veal**. Large beef supplies along with weakened export demand provided U.S. consumers with plentiful supplies, with the beef and veal CPI falling 0.3 percent in 1996. However, cow and heifer herd downsizing, which started mid 1995, should affect beef production in second-half 1997. Beef production is expected down 1 percent in 1997, with the CPI for beef and veal expected to increase 1 to 3 percent.

- **Pork**. Retail pork prices increased 9.9 percent in 1996, due to lower pork output, fast-paced exports in the first half of the year, and brisk demand for bacon in the fast-food industry. With 1997 pork production expected to remain near 1996 levels, the CPI for pork is expected to increase 3 to 5 percent in 1997.

- **Other meats** increased 3.6 percent in 1996 and is expected up 1 to 3 percent in 1997. Other meats are highly processed food items with their price change influenced more by the general inflation rate than by the cost of the meat inputs.

- **Poultry**. Continued strength in domestic and export demand along with higher feed prices boosted poultry prices 6.2 percent in 1996. Slower production increases in 1997 for broilers and turkeys, and lower production for total red meat during the first quarter 1997 should contributed to higher broiler prices. The CPI for poultry is expected to increase up to 2 percent in 1997.

- **Fish and seafood**. In 1996, prices for the major fish items--tuna, salmon, and shrimp remained flat. The CPI for fish and seafood went up 0.9 percent in 1996, with an expected 2 to 4 percent increase in 1997.

- **Eggs**. Egg prices were especially volatile in 1996, going up 18.0 percent. Strong domestic demand, especially from the fast-food industry, and foreign demand, kept retail prices higher throughout the year. Continued increases in production during the 4th quarter 1996 and into 1st quarter 1997 should result in 1997 prices averaging below the high levels of 1996. The CPI for eggs in 1997 should show no increase or decrease slightly from 1996 prices.

- **Dairy products**. Strong domestic and export demand for dairy products coupled with lower output increased the milk products CPI 7.0 percent in 1996. Lower milk

production in 1996, restrained by high feed prices and forage quality problems, contributed to the rise in retail prices. Milk production in 1997 is forecast to increase 1 percent from 1996 levels, because of increased demand and lower feed costs. Because of these factors, along with the possibility of lingering damage from the winter storms in the western states of California, Washington, Idaho, and Oregon, the 1997 CPI for dairy products is expected to rise 2 to 4 percent.

- **Fats and oils** increased 2.4 percent in 1996 and is expected to increase a modest 2 to 4 percent in 1997. Since fats and oils are highly processed food items, their price change is influenced more by the general inflation rate than by the cost of the raw commodities--including soybeans, corn, and canola.

- **Fresh vegetables**. The weather and growing conditions in the major fresh vegetables growing areas, especially California, Florida, Arizona, and Texas was almost perfect in 1996. As a result, there were no major disruptions in the fresh vegetables market, with the CPI falling 2.0 percent in 1996. However, 1997 has started out differently, with a severe Florida freeze in January damaging several fresh market vegetables--squash, snap beans, green peppers, eggplant and tomatoes. The impact on retail prices for these items will likely last from February through the end of May. Fresh-market vegetables grown in other states and not affected by the freeze include potatoes, lettuce, onions, celery, broccoli, cauliflower, and cabbage. Although the fresh vegetable CPI is expected to increase 6 to 7 percent the first 6 months of 1997, the annual increase should be less and return to trend levels, at 3 to 5 percent.

- **Fresh fruits**. Early reports from the Florida Citrus Commission indicated that the January 1997 freeze had little impact on the citrus industry. A predicted record U.S. orange crop along with production in apples should moderate the expected 3 to 5 percent increase in the fresh fruit CPI in 1997, after an increase of 7.1 percent in 1996.

- **Sugar and sweets**. Domestic sugar production declined about 7 percent in 1996, as high prices for alternative crops and lower grower returns caused some producers to switch sugar beet acreage to other crops in the spring of 1996. Along with lower sugar output, price increases for high-fructose corn syrup contributed to higher retail prices for selected sugar-related food items in 1996, boosting the CPI 4.5 percent. With total sugar supplies expected up slightly in 1997, the CPI for sugar and sweets is expected to increase 2 to 4 percent in 1997.

- **Cereal and bakery products** account for a large portion of the at home food CPI - almost 15 percent. While higher grain prices contributed to higher retail prices for selected bakery product items, retail price reductions for breakfast cereals tempered gains in the cereal and bakery products CPI to just 3.9 percent in 1996. Most of the costs to produce cereal and bread products are for processing and marketing, more than 90 percent in most cases, leaving the farm ingredients a minor cost consideration. Competition for market share among the three leading breakfast cereal manufacturers led to retail price cuts for four consecutive months in 1996; an example of how the market competition can

affect retail prices more than commodity prices. With demand for cereal and bakery products expected to continue, the CPI for cereals and bakery products is expected to rise at a rate of 3 to 5 percent in 1997.

- **Nonalcoholic beverages**. The CPI for nonalcoholic beverages fell 2.4 percent in 1996 due to retail price reductions for both coffee and carbonated beverages during part or all of the year. Coffee retail prices during the first 8 months of 1996 were down 19 percent compared with the same period the year before. Competition between the leading soft drink companies during the 1996 summer Olympic games led to lower retail prices during the peak demand season, curtailing price gains for the entire year. In 1997, however, the CPI for nonalcoholic beverages will likely increase 2 to 4 percent, due to higher wholesale coffee prices in the world market. Higher wholesale prices have been triggered by a lower than expected crop in Brazil and labor unrest in Columbia, the two major coffee producing countries.

- **Other prepared foods**. Other miscellaneous prepared foods are highly processed and are largely affected by changes in the all-items CPI. However, higher ingredient and raw material prices in 1996 caused some manufacturing price increases in selected prepared foods, boosting the CPI for other prepared foods 3.4 percent in 1996. Competition among products should dampen further retail price increases in 1997, with the other prepared foods CPI expected up 2 to 4 percent.

EVALUATION OF USDA's FORECASTS OF THE CPI FOR FOOD
An Initial Assessment

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The U. S. Department of Agriculture forecasts various components of the Consumer Price Index (CPI) for food. The industry uses these forecasts to formulate production and investment strategies; the U.S. Federal Reserve considers them in managing inflationary pressures; government policy makers use them to assess the nutritional impacts on the low income population through food stamp, school lunch, WIC, and other food-related programs. Given these uses and because of the increasing importance of food related issues, USDA began an effort last year to (1) make the forecasting procedures transparent, (2) examine the forecast accuracy and reliability, and (3) assess the potential for improvements.

The USDA began a comprehensive effort last year to examine its food price forecasts. I will report on the initial effort. The initial assessment focused on seven components of the CPI for food that were forecasted using a common procedure. These components are (1) Fish and Seafood, (2) Fats and Oils, (3) Sugar and Sweets, (4) Cereals and Bakery Products, (5) Other Prepared Food, (6) Dairy Products, and (7) Nonalcoholic Beverages. This study evaluates the Economic Research Service (ERS) procedure by comparing its forecasts of the seven CPI series with forecasts from competing models. The analysis was conducted by the Food and Consumer Economics Division (FCED) of the ERS and are explained in detail in a technical bulletin (Denbaly et. al.).

Data

The U.S. Bureau of Labor Statistics gives ERS monthly data on individual components of the food CPI. The data are seasonally unadjusted monthly series from January 1986 through February 1996. Of the seven series forecasted by FCED, all share a pronounced upward trend over the sample period, yet display different patterns.

The prices used to construct the Fish and Seafood component are: canned fish or seafood, fresh or frozen fish and seafood, shellfish, and fish. Between 1986 and 1995, this component rose nearly 48 percent. Despite some volatility around the trend, the trend appears constant and easily identified (figure 1).

The prices used to construct the Dairy Products index are: fresh whole milk, other fresh milk and cream, cheese, ice cream and related products, butter, and other dairy products. The dairy price

Figure 1. Seafood and Fish

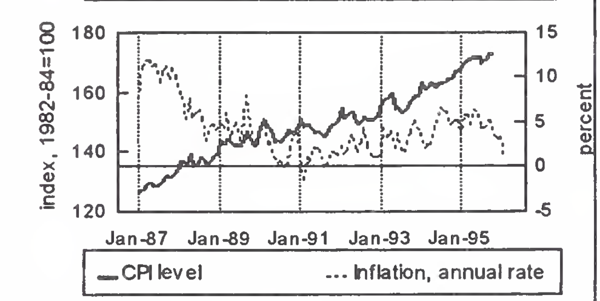


Figure 2. Dairy Products

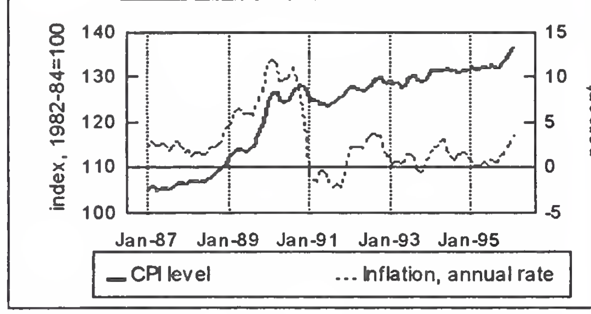


Figure 3. Oils and Fats

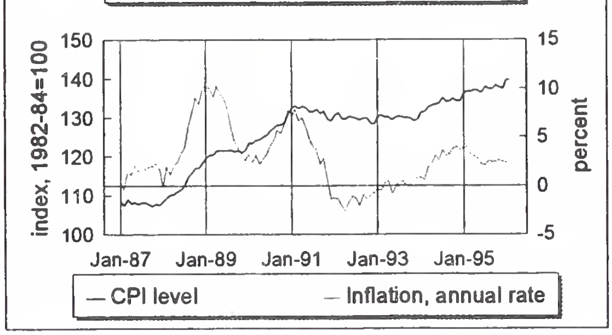


Figure 4. Cereal Products

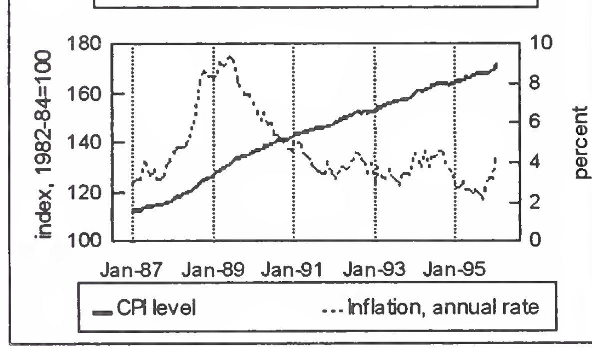


Figure 5. Nonalcoholic Beverage

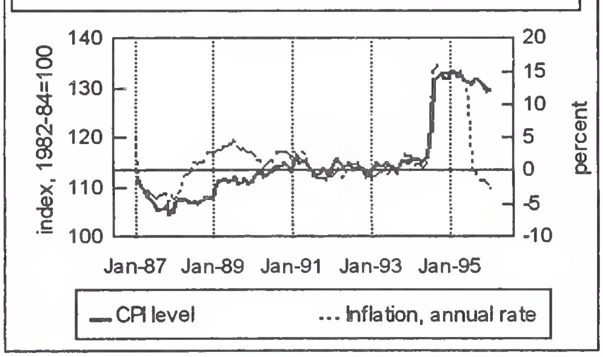


Figure 6. Sweets and Sugar

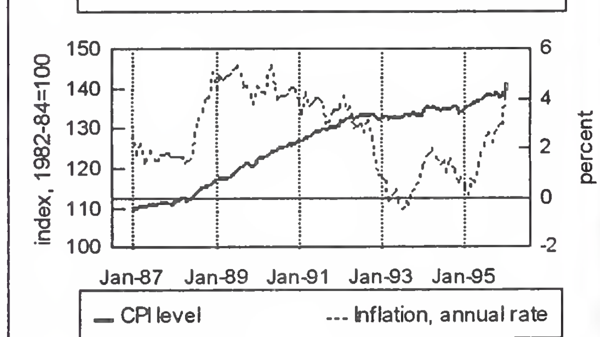
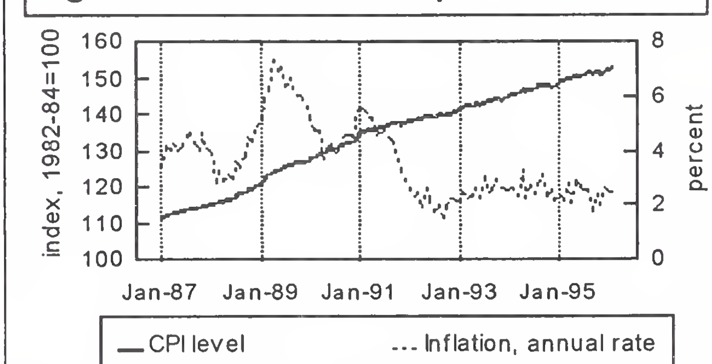


Figure 7. Other Prepared Foods



series increased by 30 percent over the sample period. It increased by 10 percent between 1986 and 1989, by 15 percent in 1990, and increased slightly from 1990 to 1995 (figure 2).

The prices used to construct the Fats and Oils component are: other fats and oils, nondairy cream substitutes, and peanut butter. Between 1986 and 1988, this index displayed no trend. In 1989, the index increases by about 15 percent, and rose by about 10 percent in 1990. The Fats and Oils price index fell slightly between 1991 and 1993 and rose by about 3 percent from 1993 to 1995 (figure 3).

The prices used to construct the Cereal and Bakery Products index are: flour, prepared flour mixes, cereal, rice, macaroni and similar products, and cornmeal. Of the seven component series, this price index rose most over the sample period -- over 50 percent. There appears to be little volatility of the series around a linear trend (figure 4).

Prices used to construct the Nonalcoholic Beverage price index are: cola drinks, carbonated drinks other than cola, coffee, tea, and other noncarbonated drinks. The index rose by 3- 4 percent between 1986 and 1994. The sharp 15 percent increase during April and May of 1994 reflected a shortage of coffee caused by a drought and an early frost in Brazil. Following this increase, the Nonalcoholic Beverage price index showed little trend (figure 5).

The prices used to construct the Sugar and Sweets index are: candy and chewing gum, other sweets, and sugar and other sweeteners. The Sugar and Sweets index increased by about 30 percent over 1986-95. From 1988 to 1992 the series closely follows a linear trend. After 1992, the series appears more volatile (figure 6).

The prices used to construct the Other Prepared Foods index are: canned and packaged soup, frozen prepared foods and meals, potato chips and other snacks, nuts, salt and other seasonings and spices, olives, pickles, and relishes, sauces and gravies, other condiments, canned or packaged salads and desserts, baby food, and other canned or packaged prepared foods. This series increased steadily by 41 percent over the sample (figure 7).

While the seven components of the food CPI display a pronounced upward trend over the sample period, each series appears to grow at different rates. The Dairy Products, Fats and Oils, and Sugar and Sweets components display different and more volatile trends in the 1990s than in the 1980s.

Changes in food price patterns between the 1980s and the 1990s occurred amid profound changes in the food industry. In the 1980s, food processors shifted away from mass-produced foodstuffs and toward higher value-added products. Mass media may have helped shift consumers' preferences for convenience, safety, and health attributes of food; and marketers lured shoppers with national brand names such as Nabisco, Campbell, and Kelloggs. The willingness of consumers to pay for these attributes led to sharp increases in the price of

nationally branded food products and to the profits of national-brand food firms. The leveraged buyouts of national firms in the late 1980s represented a demand for more brand names, and the magnitudes of some of the buyouts reflected firms' expectations that more brand names would translate into ever increasing profits.

These expectations were not realized. Since the recession of 1991, more thrifty consumers appeared to dump expensive brands for cheaper store brands. The 1980's price increases among nationally branded food products left national firms vulnerable to less costly competitors. Store-brand processors produced food products of reliably high quality, and marketed their products without the expense of advertising. Adding to the competition among processors was competition among retail outlets. Since the beginning of the 1990's, traditional outlets such as Kroger and Safeway have been challenged by warehouse clubs such as Sam's (Wal-Mart) and Pace (K-Mart). More thrifty and quality-conscious consumers and more intense competition may have flattened price increases in the 1990's.

The FCED Forecasting Procedure

The FCED forecasts the seven CPI series up to 12 months in advance. The procedure has two components: a model based estimate and a subjective adjustment based on the analyst's information about the market. The model component, derived from historical data, accounts for the specific forces and regularities of the market in question. While the subjective adjustment includes the effects of current and future events that the analysts is aware of and that historical data do not account for their influences. The initial evaluation focused on the model components.

The model assumes that the annual proportionate change in a series follows a random walk. That is, the annual growth rate of last month's CPI (relative to the same month a year ago) is the rate that projects any CPI between the two months into the future.

To clarify, Table 1 illustrates how the model component was derived in January 1995 for Seafood and Fish. First, the ratio (CPI in December 1994 / the CPI in December 1993) was calculated, 1.05 percent. [Note that in any given month the most current CPI information is the CPI in the last month.] Then, this ratio was multiplied by CPIs for January 94 through December 1994 to obtain twelve CPI forecasts, for January 1995 through December 1995. In February, the CPI for January 1995 was released. Then, the ratio was recalculated as (CPI in January 1995 / CPI in January 1994); and, eleven forecasts for February 1995 through December 1995, were obtained by multiplying this ratio by the CPIs for February 1994 through December 1994.

Note that in each month forecasting ends in December. Therefore, the number of forecasts in each month declines by one. This means that each year there is 1 forecast for January CPI, 2 forecasts for February CPI,..., and 12 forecasts for December CPI. That is each year there are 12 one-month-ahead forecasts (one for each month), 11 two-months-ahead forecasts (February-December)..etc.

Table 1. Operation of the Procedure

Months	*Data History*	*Ratio*	*1/95 forecasts*	*2/95 forecasts*	*3/95 forecasts*	...	*12/95 forecasts*
Dec-93	158.7	--	--	--	--	--	--
Jan-94	163.2	--	--	--	--	--	--
Feb-94	160.9	--	--	--	--	--	--
Mar-94	161.8	--	--	--	--	--	--
Apr-94	163.7	--	--	--	--	--	--
May-94	161.6	--	--	--	--	--	--
Jun-94	162.6	--	--	--	--	--	--
Jul-94	163.2	--	--	--	--	--	--
Aug-94	163.6	--	--	--	--	--	--
Sep-94	164.9	--	--	--	--	--	--
Oct-94	164.8	--	--	--	--	--	
Nov-94	167	--	--	--	--	--	--
Dec-94	166.9	--	--	--	--	--	--
Jan-95	169	1.05	171.63	...	...	...	...
Feb-95	170.4	1.04	169.21	166.62	...	...	...
Mar-95	171.2	1.06	170.16	167.55	171.35	...	...
Apr-95	171.6	1.06	172.16	169.52	173.37	...	...
May-95	171.9	1.05	169.95	167.34	171.14	...	...
Jun-95	172.1	1.06	171.00	168.38	172.20	...	...
Jul-95	170.4	1.06	171.63	169.00	172.84	...	...
Aug-95	170.9	1.04	172.05	169.41	173.26	...	...
Sep-95	173.5	1.04	173.42	170.76	174.64	...	...
Oct-95	173.3	1.05	173.32	170.66	174.53	...	...
Nov-95	172.9	1.05	175.63	172.94	176.86	...	...
Dec-95	172.1	1.04	175.52	172.83	176.75	...	172.80

An Alternative Model

One advantage of using the above model is its simplicity. Another advantage is that large amounts of historical data are not needed to construct a forecast. But, does this simplicity come at the cost of being inaccurate? Can we improve the forecasts by using slightly more complicated procedures?

There are many forecasting alternatives. They can be divided broadly into: (1) statistical models with constant parameters, and (2) statistical models with time-varying parameters.
To choose an alternative, we limited the search to the class of constant parameters and, more specifically, to time-series type models. The choice is motivated by the relative ease of estimating and use of time-series models and because the FCED model is itself a restricted time-series model with constant parameters.

The Economic Time Series (ETS) procedure in SAS was used to identify an alternative candidate that best fits the observations from January 1986 to July 1990. Observations from January 1986 to February 1996 were used to measure the model's forecast performance.

ETS identified an identical model, which included seasonal dummies, for all price series but dairy. (See Denbaly et. al. for details.)

Comparison of Forecast Accuracy

Out-of-sample forecasts obtained from the alternative models were used to examine forecast reliability. The evaluated forecasts were out-of-sample in the sense that samples used to estimate the model were different from the periods for which forecasts were calculated.

First, the parameters of the alternative models were estimated using the January 1986-July 1990 observations. Then, based on the parameter estimates, forecasts for the August 1990-July 1991 period were computed. The FCED predictions for the same period were also computed as described above. Next, the August 1990 observation was added, and parameter estimates for the alternative models were recompute using the January 1986 to August 1990 data. The revised parameter estimates were used to forecast the September 1990-August 1991 observations. Note that the new set of FCED forecasts required no re-estimation. This process was repeated until the March 1995 observation, when forecasts were limited to 11 months ahead. In each succeeding update, the forecast horizons were reduced by 1 month until the January 1996 observation was added to the sample, and a single forecast was generated for February 1996. This procedure resulted in 67 one-month-ahead forecasts, 66 two-months-ahead forecasts, 65 three-month-ahead forecasts, and so forth to 56 twelve-months-ahead forecasts.

Five measures were used to compare the alternatives to the FCED's. First, forecast errors were calculated by subtracting the forecasts from actual CPIs. Then, the errors were divided by actual observations to obtain forecast errors as a percentage of the observed CPI. This measure, called the relative forecast error, calculated for the alternative models was consistently lower than the relative errors of the FCED models across the seven series.

Second, for 1, 2, 6, and 12 month forecast horizons, and each of the seven CPI categories, the errors were summed and divided by the number of available forecasts. This indicator, called mean error (ME), measures how close the average value of a forecast for a particular horizon is to the average value of the observations. Table 2 reports results. All MEs are small. For Fish and Seafood, the 1-month ME value of the FCED model, -0.011, is in absolute value smaller than the ME value for the alternative -0.143. This is the case for many other MEs. However, the ME measures forecast bias, and negative forecast errors offset positive forecast errors. Therefore, a better measure is to recalculate the ME using the absolute forecast error values. This measure, called the mean absolute error (MAE) is always positive. Table 3, reports that all MAEs, except two, are smaller for the alternative model. In addition, if a ME value is roughly the same magnitude as a MAE value, systematic forecast bias maybe suspected. Both the FCED and alternative models generate forecasts with generally small bias, and the differing magnitudes of the MAE statistic suggest no significant systematic bias.

Another measure of comparison is the reliability of the forecasts. That is, the wider is the range of possible forecasts for a model, the less reliable is the forecast. Two alternative indicators can be used to assess reliability: mean absolute percentage error (MAPE) and root mean squared errors (RMSE). The MAPE is calculated by summing the absolute values of the relative forecast errors and dividing it by the number of available forecasts. The RMSE is calculated by taking the square root of the sum of the squared forecast errors and dividing it by the number of available forecasts.

Table 4 and 5 report the results. The MAPE associated with the 1-month forecast of the Fish and Seafood series is 0.988 for the FCED model and 0.697 for the alternative model. Except in one case, the MAPE and RMSE are smaller for the alternative models, suggesting they are more reliable.

Conclusions

It is important to remember that the FCED forecasts are made of a model-based component and a subjective adjustment; and, that the evaluation only addressed the model component. Based on this evaluation the FCED models have been revised. In generating the alternative models' forecasts, estimates of the correlation of the time series are revised as new information becomes available. Because the FCED model is not based on estimates of statistical correlation, new data does not lead to better parameter estimates and to, presumably, better forecasts. What is surprising is how well the FCED model performs despite this limitation.

Table 2. Mean Error Forecast Comparison (8/90 to 2/96)

Month-Ahead Forecast								
	1		2		6		12	
	FCED	ALTER.	FCED	ALTER.	FCED	ALTER.	FCED	ALTER.
Fish & Seafood	-0.011	-0.143	0.054	-0.248	0.237	-0.616	0.965	-0.797
Dairy	-0.113	0.059	-0.274	0.138	-0.758	0.439	-0.695	1.300
Fats & Oils	-0.042	-0.165	-0.090	-0.284	-0.426	-0.904	-1.044	-1.443
Cereals & Bakery	-0.033	-0.063	-0.057	-0.137	-0.265	-0.485	-0.632	-1.050
Non Alcohol	-0.109	0.055	-0.246	0.111	-0.730	0.534	0.175	1.726
Sugar & Sweets	0.008	-0.059	0.015	-0.120	-0.119	-0.508	-0.462	-1.251
Other Prep.	-0.032	-0.098	-0.067	-0.190	-0.293	-0.623	-0.699	-1.347

Table 3. Mean Absolute Error Comparison (8/90 to 2/96)

Month-Ahead Forecast								
	1		2		6		12	
	FCED	ALTER.	FCED	ALTER.	FCED	ALTER.	FCED	ALTER.
Fish & Seafood	1.553	1.101	2.112	1.609	2.035	1.994	2.683	2.656
Dairy	0.836	0.552	1.416	0.917	2.926	1.865	3.745	2.420
Fats & Oils	0.699	1.000	1.008	1.280	2.236	1.726	3.785	2.198
Cereals & Bakery	0.502	0.388	0.650	0.443	1.047	0.785	1.510	1.237
Non Alcohol	1.161	0.820	1.882	1.307	4.757	3.013	7.368	5.075
Sugar & Sweets	0.488	0.370	0.669	0.511	1.354	1.046	2.002	1.773
Other Prep.	0.505	0.354	0.499	0.377	0.863	0.826	1.290	1.473

Table 4. Mean Absolute Percent Error Comparison (8/90 to 2/96)

	Month-Ahead Forecast							
	1		2		6		12	
	FCED	ALTER.	FCED	ALTER.	FCED	ALTER.	FCED	ALTER.
Fish & Seafood	0.988	0.697	1.342	1.020	1.276	1.267	1.667	1.687
Dairy	0.649	0.426	1.100	0.707	2.287	1.444	2.916	1.868*
Fats & Oils	0.532	0.503	0.766	0.689	1.695	1.462	2.874	1.896*
Cereals & Bakery	0.319	0.248	0.414	0.284	0.661	0.500	0.949	0.783*
Non Alcohol	0.947	0.674	1.511	1.057	3.750	2.386	5.769	3.981*
Sugar & Sweets	0.365	0.277	0.499	0.382	1.004	0.780	1.483	1.319*
Other Prep.	0.351	0.248	0.350	0.264	0.608	0.578	0.907*	1.000

Table 5. Root Mean Squared Error Comparison (8/90 to 2/96)

	Month-Ahead Forecast							
	1		2		6		12	
	FCED	ALTER.	FCED	ALTER.	FCED	ALTER.	FCED	ALTER.
Fish & Seafood	1.939	1.412	2.548	1.920	2.568	2.389	3.045	3.130
Dairy	1.192	0.682	2.125	1.133	4.370	2.341	5.274	2.759
Fats & Oils	0.910	0.822	1.336	1.062	2.994	2.090	4.888	2.676
Cereals & Bakery	0.620	0.504	0.766	0.542	1.265	0.868	1.678	0.960
Non Alcohol	2.199	1.464	3.846	2.620	7.944	5.349	10.71	7.345
Sugar & Sweets	0.598	0.489	0.831	0.662	1.649	1.198	2.457	1.815
Other Prep.	0.610	0.418	0.609	0.445	1.101	0.728	1.679	0.863

CONSUMER PRICE INDEX OVERSTATES FOOD PRICE INFLATION

James M. MacDonald
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The Consumer Price Index (CPI) has long been criticized by academic and government analysts on the grounds that inherent biases in the index lead to substantial overestimates of changes in the cost of living, and corresponding underestimates of growth in real incomes and productivity. The matter began to receive close media and political scrutiny in January of 1995, when Federal Reserve Board chairman Alan Greenspan informed the Budget Committees of Congress that "the official CPI may be overstating the increase in the true cost of living by perhaps 1/2 to 1 and 1/2 percent per year..." and that that overstatement led to large increases in government expenditures in indexed entitlement programs. He suggested that reductions in CPI bias could eliminate the federal deficit.

The Senate Finance Committee assembled an Advisory Commission to study the Consumer Price Index, commonly referred to as the "Boskin Commission" after its chair, Professor Michael Boskin from Stanford University (other members were Ellen Dulberger from IBM, Zvi Griliches from Harvard, Robert Gordon from Northwestern, and Dale Jorgenson from Harvard). The Commission issued a final report ("Toward a More Accurate Measure of the Cost of Living") on December 4, 1996. That report contains the Commission's best estimate of CPI overstatement (1.1 percentage points per year), an assessment of the several sources of bias, and a summary of the likely implications of CPI overstatement.

The Commission's report, and much of the surrounding discussion, emphasizes the difficulty of accounting for new products and changes in product quality in the CPI. The focus of that discussion has been on sectors, such as consumer electronics, automobiles, and medical care, that have a lot of innovation and technological change. That emphasis misses an important point: the likely CPI bias in the food at home sector is high (about 1.9 percentage points per year), and can be fixed more readily than problems stemming from innovation in rapidly growing sectors.

Table 1 summarizes the best estimates of CPI overstatement for the overall CPI as well as the components for food at home and food away from home. It breaks the overall bias down into the four sources used by the Boskin Commission. The estimates for the overall CPI are taken from the Boskin Commission's final report, and the estimates for new product/quality change bias in food sectors are also the Commission's estimates. Estimates for the other three bias categories in food at home and food away from home are ERS estimates based on review of considerable research performed by academic and government economists.

The Commission's best estimate of bias in the overall CPI is 1.1% per year, and more than half of that is due to problems in handling new product and quality change. The ERS estimate of overstatement in the Food at Home CPI is substantially higher, 1.9% per year, and more than half of that is due to another source of bias--Lower Level Substituition Bias. Estimates of bias in the Food Away from Home CPI are substantially lower.

The underlying research, most of it done by economists at the agency that produces the CPI (The Bureau of Labor Statistics), suggests that lower level substituition bias has been a serious problem for the food at home CPI since 1978, leading to substantial overstatement of food price inflation for nearly two decades. The BLS recently introduced some procedural changes that will reduce the effect of this bias, and further feasible procedural changes could eliminate it.

One source of bias (Upper Level Substituition Bias) is a well known staple of economics textbooks, and another (New Product/Quality Bias) has been an important and longstanding focus in economic research. But two others (Lower Level Substitution Bias, and Outlet Substituition Bias) are less well known. The latter two are particularly important in the food sector, and in fact the evidence on them is almost entirely based on analyses of the food sector. In order to clearly understand each of the four it's important to first understand how the CPI is constructed.

CPI Construction

The CPI is constructed in two stages, and the key to understanding CPI biases is to understand how items are selected for pricing and how their price changes are aggregated at the two stages into an index.

At the upper stage of index aggregation, a monthly CPI is built up from 44 geographic categories (such as the Atlanta metropolitan area) and 207 product categories (such as Apples, or White Bread), which are combined to form 9,108 price indexes, one for each "strata" of an item and geographic category. In order to aggregate these strata indexes into the overall CPI and its components (such as Food at Home), the BLS uses information on household expenditure patterns from the Consumer Expenditure Survey to develop weights applied to the strata indexes and components. The current weights were introduced to the CPI in 1987 and are based on expenditures over 1982-84 (a three year time span is used to expand sample size and thereby reduce sampling errors in the estimated weights). New weights from 1993-95 Surveys will be introduced in 1998.

At the disaggregated stage, separate strata indexes are calculated for each product category in each geographic category using representative samples of outlets and item prices. Outlets are selected using a Point of Purchase Survey (POPS), in which households are asked about the outlets at which they purchased goods and services. The results are used to select outlets for pricing, with the probability of selection proportional to expenditure shares as revealed in a

POPS. Data collectors then go to the selected outlets and select specific items for pricing (such as Red Delicious apples, or a 5 lb. bag of Gold Medal All-Purpose flour). Specific items are selected randomly, with the probability of selection driven by the item's share of an product category's (Apples, Flour) sales in an outlet. Since this procedure means that different items (Red Delicious vs. Rome apples) could be priced in different outlets, the samples become less useful for comparing levels of prices. Rather, the index aims to aggregate relative price changes.

Because buying patterns are infrequently surveyed at upper levels of the CPI, the weights assigned to upper level components, such as Apples, Fresh Fruit, Fruits and Vegetables, and Food at Home, are kept fixed for extended periods of time. But because Point of Purchase Surveys are done in 20% of the CPI sample each year, the CPI keeps up with changes in buying patterns at lower levels, among outlets and within product categories.

How do we go from price collectors to the CPI? First, BLS personnel construct price relatives (the ratio of this month's price to last) for each priced item. Lower level aggregation is done by calculating the simple arithmetic mean of the price relatives for specific item varieties. That is, each strata index is simply the average of price relatives across sample outlets and items in that strata. Since outlets and items are selected with probability proportional to sales, this is equivalent to weighting price changes at outlets by sales. Upper level indexes are formed by weighting component item strata indexes by the fixed weights derived from the relevant Consumer Expenditure Survey. Each substituition bias is based on specific problems that arise at these aggregation stages.

Upper Level Substituition Bias

"Upper Level" bias is the traditional textbook substituition bias of a Laspeyres index, and arises because the CPI maintains fixed weights calculated at the beginning of the comparison period. Using fixed weights that are dated create two problems. First, as consumer expenditure patterns change, the old set of weights become less relevant as measures of the price changes faced by representative consumers; the current CPI assumes that food at home occupies the same share of household budgets that it did in 1982-84, when we know that food's budget share has clearly declined. But Upper Level Substitution Bias actually refers to a related and more systematic problem. Some product categories have had relatively high price increases since 1982-84; for example, prices for fresh and frozen fish rose by about 99% between 1982-84 and 1996, while prices for beef rose by 38%, according to the CPI indexes for each. Consequently, some people will shift away from fish and toward beef because beef became relatively less expensive; but the CPI is constructed on an assumption that purchase patterns are unchanged. In brief, the index will systematically overstate the weights that consumers place on products that are rising quite rapidly in price, while understating the weights that consumers place on products whose prices are not rising as rapidly.

The BLS has done a lot of research on this sort of bias; it can be evaluated retrospectively by reweighting the index with later Consumer Expenditure Survey data. Estimates of the effect

cluster in a range of .10 to .30, depending on the products evaluated. Table 1 cites the Commission's estimate for the overall measure, while the number for food at home is taken from published research. Food at Home is larger because consumers are more likely to substitute among food at home categories in response to price changes. The term "Upper Level" means that this bias refers to substitution among product categories (Apples or Bananas) and not to substuition among items and outlets within those strata.

Lower Level Substitution Bias

Recall how recorded price changes at outlets are aggregated to the strata level: simple averages of price relatives. This formulation can create a serious bias, an "inflationary drift" that is not necessarily about substituition. Suppose iceberg lettuce is priced at two outlets: price rises from \$1.00 to \$1.50 in one, and falls from \$1.50 to \$1.00 in the other. The two price relatives are 1.5 and .67, and the mean price relative is 1.085, an 8.5% "average" price increase. Suppose prices reverse again in the following month. The index will record another 8.5% average price increase, even though average prices have been unchanged for two months. The problem is particularly important for products with substantial month to month or outlet to outlet variation in price changes, and is particularly important for fresh fruits and vegetables (where CPI bias is on the order of 3.0 to 5.0% annually) and also for fresh meats.

BLS procedures also introduced a subtle spurious correlation between price changes of outlets newly introduced into the sample and their (implicit) weights. The nature of the POPS means that outlets about to raise prices were more likely to be introduced into the CPI sample, and outlets about to cut prices were less likely to be introduced. The BLS recognized this problem in 1994, and changed procedures in January of 1995 in order to deal with this problem. The agency estimates that the changes, which it calls "seasoning", will remove 0.4% from lower level substitution bias in the CPI for food at home; looking forward, then, Lower Level Substituition Bias in the food at home CPI should be 0.7% per year and the all sources bias for food at home is estimated to be 1.5% per year.

A simple adjustment can remove the rest of the Lower Level Substituition Bias. If, rather than average the price relatives (1.5 and .67 in the example above), BLS instead averaged the natural logs of the price relatives (+.4005 and -.4005), the drift would be eliminated. BLS has generated experimental indexes based on this approach of calculating geometric rather than arithmetic means, and has found that the Food at Home CPI would be reduced by a further 0.7%, if seasoning was also retained. Because the problems seem to arise in the formulas used to aggregate price changes at lower levels of the index, the BLS refers to this source of bias as "Formula Bias".

Lower Level Substitution, or Formula, Bias can be quite large for products whose price changes fluctuate widely over time or across outlets. In particular, the CPI for fresh fruits and vegetables has probably been dramatically overstated; BLS research suggests that the simple formula adjustment outlined above would reduce the growth in the CPI for fresh fruits and vegetables by

4.50% per year. Other research finds estimates of overstatement in the range of 3.0-5.0% per year for that category. Nonfood prices are more stable, so the overall effect is estimated to be less. Because Away from Home prices are also more stable, and therefore the adjustment would have a smaller effect on Away from Home.

Outlet Substituition Bias

Ongoing POPs surveys lead to sample "refreshment", with about 1/5th of the index's outlets being newly drawn each year. BLS research has shown that newly entering food outlets have prices that average about 1.25% below the prices of exiting outlets. At present, this price difference is not included in CPI calculations. If replacement is occurring in January, for example, then the CPI will include a November to December price relative for the old outlet in the December CPI, and a December to January price relative for the new outlet in the January CPI. In other words, the CPI only includes price changes within outlets, and excludes price differences across outlets.

Current BLS procedure assumes that any outlet price differences reflect corresponding unobserved quality differences that are "paid for" by the price difference (estimated price differences can be based on the December overlap in the above example). Commission, BLS, and popular commentary on the Boskin Report seems to accept the BLS assumption at face value, by assuming that the source of this price difference is warehouse stores and Walmart (what the *Economist* calls "Americans' prediliction for shopping at discount stores").

The BLS procedure is actually the correct one to follow, and there is therefore no bias, if new outlets do offer lower quality and fewer services, and if the price difference between outlets reflects that. The index shouldn't record poorer service as if it were a price decline for comparable services. But much of the shift in patronage in the last decade is toward larger food stores that offer lower prices and greater quality, in the sense of greater breadth of product line and more services, achieved through realization of scale economies offered by high sales volumes. If that's true, then outlet price differences should be included in the CPI.

If outlet price differences were included in the index, the Food at Home CPI would likely have grown about 0.25% less per year over the last decade (see table 1). Because all of the research refers to grocery outlets, the Boskin Commission reduced that estimate for the overall CPI. Table 1 keeps their reduction for Food Away from Home, but I think that truth is likely to be closer to zero, because we haven't seen the same sort of structural change in outlet sizes that we've seen in food retailing. Moreover, this estimate is actually backward-looking; that is, it is based on the dramatic changes in retailing of the last decade and a half. It will not hold for the future if structural change toward larger and lower priced food stores does not continue.

New Product/Quality Change Bias

This is conceptually similar to outlet substituition bias. Suppose a new, higher quality television is introduced to the market, and further suppose that it is introduced into the CPI in January. The December CPI will include the November-December price relative of the old models that are

rotating out of the sample. The January CPI will include the December-January price relative of the new model. In short, the index will only measure price changes within models, and will ignore any quality gains. Of course, many new consumer electronic models offer lower prices and higher quality than old models, and the index will generally ignore cross model price reductions.

In some cases, the quality improvement will occur for an existing model (this year's version of the existing television model is better). In that case, BLS may continue pricing the model, and if higher quality comes at a higher price, the increased price will be entered into the index, but not the value of increased quality.

A related problem concerns the timing of new product introduction to the CPI. Many new product prices fall sharply early in the product's life cycle, and later stabilize and begin to rise relative to other products. The BLS's well known lags in introducing new product categories to the index (the current example being cellular phones) means that products early in their life cycle (with falling prices) are underrepresented in the index.

A considerable amount of research, much of it by Commission members, has gone into this topic, with most of it focussed on electronics, appliances, automobiles, pharmaceuticals, and medical care. The research finds that these effects can be very large, and the Commission's report assigns more than half of the overall CPI bias to this source. The Commission also asserts that the effect of the CPI for Food is overstated by 0.3% annually because of this bias, but their evidence is entirely speculative. There is at present virtually no reliable evidence on the existence or extent of this bias for food products.

What is Likely to Happen?

The Boskin Commission Report makes a variety of recommendations to the BLS, to Congress, and to professional economists. The BLS has provided a detailed set of responses to the report, available at the agency's website. Some are feasible immediately, and some may become feasible. Some of the feasible recommendations are likely to be implemented, but some are not because they are expensive or because they are conceptually controversial.

The BLS could reduce or eliminate Lower Level Substituition Bias at little cost by replacing the lowest level price arithmetic mean price relatives with geometric means. The existing method violates some basic standards for an adequate price index and the new way would not fundamentally alter the CPI at upper levels. Moreover, the BLS is already producing an experimental index based on geometric means. For those reasons, this is the most likely change. If carried out it will have an important impact on the Food At Home CPI, reducing it by 0.70% annually and reducing growth in the fresh fruits and vegetables component by considerably more. These changes are in addition to the effects of the "seasoning" changes introduced in January of 1995, which appears to reduce the growth in the food at home CPI by 0.40% per year. Taken together, those two changes would have a major impact on estimates of food price inflation, and the bias should have a major impact on how we view measured food price inflation since the late 1970's.

The BLS could also easily adjust the index at little cost to take account of outlet substituition bias, as defined above. The change would have a modest (0.25%) effect on the CPI for Food at Home, but we don't know if it is really appropriate to introduce outlet price differences, and the introduction would open up a wide range of related issues on product quality. Because this step is so conceptually controversial, I don't expect it to happen, and I'm not convinced that it should.

The BLS could retrospectively adjust the CPI for Upper Level Substituition Bias with expanded Consumer Expenditure Surveys. That would require some new substantial funding, and the new index would appear late, 18-24 months after the corresponding CPI. This step is feasible ane extra expense is not exorbitant. Nevertheless, it is far from certain because it would require additional funding, it would require an important conceptual shift in what the index aims to measure, and it would be reported with a fairly long lag.

Quality biases are often very difficult to handle. The BLS does frequently make procedural adjustments to handle quality change issues, and these changes have had a large aggregate effect on the index. But in many cases, analysts don't have a strong theoretical framework to guide them and don't have the reliable data needed to apply the theory that is there. As a result, major and far-reaching changes are not likely to happen, and any change that would affect food is both infeasible and unlikely to be implemented.

In conclusion, likely future changes in CPI construction could reduce the CPI for Food at Home by 0.70%, in addition to the 0.40% reduction caused by shifts in BLS procedures in early 1995. I should also caution you that most of the evidence for these estimates is based on BLS experiments over short time periods; the estimates may therefore have a wide margin of error for economic environments different from the recent past.

Changes in Food Price Indicators
1995 through 1997

Items	Relative importance [1]	1995	Final 1996	Forecast 1997
	--Percent--	------Percent Change------		
All Food	100.0	2.8	3.3	2 to 4
Food Away From Home	37.3	2.3	2.5	2 to 4
Food at Home	62.7	3.3	3.7	2 to 4
Meats	12.2	0.1	3.5	1 to 3
Beef and Veal	6.2	-0.8	-0.3	1 to 3
Pork	3.4	0.7	9.9	3 to 5
Other Meats	2.5	1.5	3.6	1 to 3
Poultry	2.7	1.4	6.2	0 to 2
Fish and Seafood	2.4	4.8	0.9	2 to 4
Eggs	1.0	5.4	18.0	-4 to 0
Dairy products	7.4	0.8	7.0	2 to 4
Fats and Oils	1.6	2.8	2.4	2 to 4
Fruits and Vegetables	12.7	7.7	3.5	3 to 5
Fresh Fruits and Vegetables	8.9	10.3	2.8	3 to 5
Fresh Fruits	4.5	8.8	7.1	3 to 5
Fresh Vegetables	4.5	12.1	-2.0	3 to 5
Processed Fruits and Vegetables	3.8	2.2	5.0	2 to 4
Processed Fruits	2.1	3.1	5.8	2 to 4
Processed Vegetables	1.6	1.2	4.0	2 to 4
Sugar and Sweets	2.1	1.7	4.5	2 to 4
Cereals and Bakery Products	9.2	2.8	3.9	3 to 5
Nonalcoholic Beverages	5.0	6.9	-2.4	2 to 4
Other Prepared Foods	6.5	2.4	3.4	2 to 4

[1] BLS estimated expenditure shares.

Table 1: Estimates of Annual Average Biases in Consumer Price Index.

Type of Bias	CPI Component: Overall	Food at Home	Food Away from Home
Upper Level Substituition	0.15	0.25	0.10
Lower Level Substituition	0.25	1.10	0.10
Outlet Substituition	0.10	0.25	0.10
New Product/Quality Change	0.60	0.30	0.30
All Types	1.10%	1.90%	0.60%

Sources: All estimates for the Overall CPI, and the New Product/Quality Change estimates for other components: Advisory Commission to Study the Consumer Price Index (The "Boskin Commission"), "Toward a More Accurate Measure of the Cost Of Living", Final Report to the U.S. Senate Finance Committee, December, 1996. All other estimates are ERS estimates based on review of existing research.

WORLD AND U.S. OUTLOOK FOR SUGAR AND SWEETENERS

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INTRODUCTION

Soon, in 1999, the World Trade Organization will be renewing negotiations to further reduce barriers to world agricultural trade. Progress was made in the Uruguay Round which, among the various "rounds" of the General Agreement on Tariffs and Trade (GATT) to eliminate trade impediments, was the first to seriously include consideration of agriculture. The Uruguay Round, which came into force in 1995, made only modest gains in agricultural trade, but nonetheless is a significant step through an agreement on commitments and disciplines on market access, export subsidies, and internal support. The direction of change is important for sugar, a commodity with world market prices notoriously volatile and uncertain because of universal intervention by national governments in production and distribution. Sugar is an important food derided as "empty calories" by some, but undeniably a significant source of vital energy for most people and a valued food ingredient in many products, desired not only for its unique "sweetness profile" but its preservative, browning, bulking, and other food preparation virtues. There are many sweeteners, but the "gold standard" remains sugar. Multilateral reductions in trade barriers,with appropriate transition periods for fair consideration of environmental and labor disparities, would permit comparative advantage to determine sugar production and distribution, lower world average cost of production, and raise income.

The U.S. is a major consumer of sugar and a major producer with some of the most efficient producers and processors in the world. Average cost of production has been trending down, making the U.S. more competitive. In this Outlook Forum, my colleague Ron Lord and I will be providing some indicators of a dynamic industry that has experienced major competitive restructuring in the past decade. We shall also present a shortterm outlook for the 1996/97 fiscal year which is the first year of the Federal Agriculture Improvement and Reform Act of 1996 that puts the industry on a more competitive, market-oriented basis, and we provide longerterm projections to fiscal 2003, the closing year of the 1996 Farm Act. No longterm projections of world sugar will be given, as the world market is a reflection of disparate national entities, many of which are important enough to be pricemakers in world trade. We do have a view of the current 1996/97 year, and we shall begin with that, in the context of changes in the past decade. These changes clearly indicate the rising importance of developing countries and in particular Asia in world sugar production, consumption, and trade potentials.

WORLD SUGAR OUTLOOK

Production

World sugar production in 1996/97 is forecast at a record 125.1 million metric tons (mmt), raw value, up 2.1 percent following increases of 5.5 and 5.8 percent in the previous two years. Over the decade (average 1984/85-1994/96), production increased at an average annual rate of 1.9 percent.

Asia has become the largest source of sugar production in the world, rising to 1/3 of world output from just over 1/5. A big contributor to that is India, whose production more than doubled (110 percent increase). In 1996/97 Asia's production will be down slightly, primarily from lower production in India. India's harvested cane area and yield are somewhat reduced, but also influential is the role of domestic prices which were low enough to divert some cane from centrifugal sugar production into gur (a crude noncentrifugal sugar). China, the second largest producer in Asia, is forecast to increase production by about 250,000 tons, to 7 million tons in 1996/97, about 80 percent in cane and the rest beet sugar. Thailand, The third largest producer in Asia, is forecast to produce a record 6.5 million tons this year. Like India over the decade Thailand has increased production 110 percent. Production cost is among the lowest in the world, but the government controls monthly sales and export licenses.

Latin America (Central and South America, Caribbean, and Mexico) is forecast to produce 34 million tons in 1996/97, an increase of almost 3 percent (about 1 million tons, of which 80 percent from Brazil and 15 percent from Cuba). Brazil's forecast production would be a record 14.5 million tons, resulting from higher area, cane yields, and factory recovery of sugar from cane. Brazil has increased production over the decade by about 55 percent. In contrast, Cuba's production over the decade has declined 45 percent, as its lucrative oil-for-sugar barter with the former Soviet Union (FSU) was cancelled. A new barter arrangement has come into force, without the highly escalated sugar price equivalents. Over the past decade, Latin America's sugar production increased 14 percent, but its share of world output is smaller, down to 27 percent as a result of Asia's ascendancy.

Production in the FSU is forecast to be down 15 percent to about 5.4 million tons, with reductions in both the Ukraine (minus 800,000 tons) and slightly in the Russian Federation. Production has fallen drastically following the breakup of the USSR, and average 3-year production in 1994/95-1996/97 is placed at 5.8 million tons, down from 8.5 million in 1984/85-1986/87.

The European Union (EU) is forecast to increase production to 17.2 million tons in 1996/97 (largest in the world if the EU were considered a country), up nearly 1.5 percent from last year but below its 1993/1994 record of 18.4 million. The United States, which ranks as the world's fifth largest producer (just below China and just above Thailand) will produce about 1 percent less in 1996/97.

Consumption

World sugar consumption is forecast at 123.1 million metric tons in 1996/97, up 3.8 percent on top of an increase of 4.4 percent last year. Over the two years, the increase would be almost 9.5 million tons, in contrast to stagnation in the early 1990's. (Between 1990/91 and 1994/95 consumption increased only 1.7 million tons, at an average annual rate of .4 percent compared with the average rate of 1.6 percent for the period 1984/85-86/87 to 1994/95-96/97. The lower rate in the early 1990's reflects primarily the disruption of consumption in the FSU. Consumption fell 2.9 million tons, almost as much as production. Central Europe, too, experienced drastic decline in both output and consumption in that 4-year span. However, consumption seems to have stabilized in those two areas over the last two years.)

In 1996/97, Asia's sugar consumption is forecast to rise about 5 percent (2 million tons), on top of an increase of 4.4 percent the previous year. Strong increases are also forecast for Latin America (3.3 percent in South America) and North Africa-Middle East (3.2 percent). Asia now accounts for about 34 percent of world sugar consumption compared with 28 percent a decade ago. Developing countries now acount for 66 % of world sugar consumption, compared with 58 percent a decade ago.This could strengthen the factor that has helped hold price to moderate levels since the last price spike of 1980/81: the fact that countries with lower incomes tend to drop out of the market when prices are exceedingly high. We note, however, that "developing countries" is a term increasingly tenuous because of rapid industrializtion in many of these countries.

Stocks, Trade Potentials, and Prices

Production over the past two years exceeded consumption, and this is expected again in 1996/97, so that stocks are estimated to rise to 26.8 million tons. The world sugar stocks-to-use ratio has also been rising, from 16.5 percent in 1993/94 to an estimated 21.8 percent in 1996/97, putting pressure on world sugar prices. The world raw sugar spot price (Contract # 11, f.o.b. stowed in Caribbean ports including Brazil, bulk) eased from the 1994/95 average of 13.9 cents a pound to 12.4 cents in 1995/96 and averaged 11.4 cents in the first fiscal quarter of October-December 1996. Since then the price has softened. How far will prices fall?

Futures prices relative to the spot price are currently inverted, perhaps in the expectation of a third consecutive year of world record production. Predicting price is a chancy matter in any case because policy decisions of any of a number of countries, intervening in the market, can easily tip the outcome. India, for example, accumulated substantial stocks in 1994/95 and 1995/96 and could export 1.5 million tons in 1996/97. An estimated reduction of half a million tons of stocks in 1996/97 would still leave stocks at about 7.2 mmt, just half of which would amount to 10 percent of world exports of 35.5 million forecast in 1996/97, which is a very substantial potential impact on trade.

China is forecast to import 2.5 million tons in 1996/97, yet is always hard to predict because government imposes supra-commercial goals. Per capita sugar consumption can be decreed instead of allowed to be settled by the market, as in 1993/94 when China was actually a net exporter, having imported as little as 0.9 million tons and exported 1.1 million, and consumption was permitted to fall. Data on per capita consumption tend to be tenuous but estimates are that China ordinarily consumes 6-7 kilograms, compared with 12-13 kilograms for Indonesia, 18-19 . for Japan, 41-42 for Mexico, and 34-35 for the EU.

With the demise of the USSR-Cuba special trading arrangement at premium prices above the world price quote, the major premium-price arrangements remaining are the EU's Lome' Agreement and the U.S. tariff-rate import quota for 40 countries. However, the world price quote is still far from being a free market result. The artificially low price level and uncertainty of the so-called world price stems from the heavy hand of government intervention in sugar industries throughout the world. Two-thirds of world exports are accounted for by Brazil, the EU, Thailand, Australia, and Cuba, all of which, in varying degrees, officially intervene in sugar marketing. Australia has recently decided to eliminate its tariff on sugar imports but continues with "single desk" selling. Given the uncertainties which underlie the so-called world market price, it is difficult to have much confidence in forecasting prices, but we are willing enough to enter into the spirit of "fearless forecasts" and predict a 1996/97 average world sugar price, measured by the # 11 contract, at 10.5-11 cents a pound.

U.S. SUGAR OUTLOOK

The U.S. sweetener market is the largest and most diverse in the world. The U.S. produces more sugar than all but three other countries--Brazil, India, and China--and is one of the few countries with significant production of both sugar beets and sugarcane. This year the U.S. is the third largest importer and second largest consumer of sugar in the world. The U.S. produces about 75 percent of the world's high-fructose corn syrup output, and also produces and consumes large amounts of high-intensity (low-calorie) sweeteners.

Like other sugar and sweetener producing countries, the U.S. has taken measures to protect its industry from a world market that reflects a great deal of national intervention. While arguments are aplenty on who is the greater market intervenor, one characteristic of the U.S. market is the fierce competition within the nation's borders. There is no single-agency selling, and there is competition between beet and cane sugar sellers as well as among beet processors, among cane refiners, and between sugar and alternative sweetener suppliers. Along with the competition has been a process of rationalizing the industry toward greater and more efficient operating capacities.

Structural Change

Within the beet sector, there has been much restructuring. Sugar beet production is up, to an

average 28.8 million short tons in fiscal years 1995 to 1997 from 23.3 million short tons a decade ago (24 percent), but California has lost 1.7 million and now accounts for only 11 percent of the U.S. total versus 21 percent a decade ago. Minnesota and North Dakota combined have raised their U.S. share to 42 percent from 32 percent. The number of factories processing sugarbeets has declined from 42 to 30, but average factory slicing capacity has risen to 6,054 tons per day, up from 4,074 in 1982 when the sugar loan program started. Beet processing capacity is estimated at about 181,600 short tons of sugar beets per day, 6 percent above 1982 but 2 percent less than in 1994.

Within the cane sector, sugarcane production rose 11 percent over the decade to an average 30.3 million tons in fiscal years 1995-1997. Production rose in all States except Hawaii where harvested area fell almost 50 percent. Seven Hawaiian cane processing companies have shut down in the past decade. On the other hand, Louisiana now commands 32 percent of the total, up from 21, with average grinding capacity up 46 percent.

In cane refining, the industry structure similarly shows much change. Companies have been reduced to 6 from 14 in 1982, and the number of factories reduced to 11 from 22. Despite an increase of 40 percent in average melting capacity, total U.S. refining capacity is down 27 percent. The decline of cane refining output is partly the result of the increased share of beet sugar production relative to cane, but largely from decreased demand for sugar brought on by HFCS substitution through the mid-1980s, and the subsequent reduction in sugar imports. The share of U.S. sugar consumption provided by domestic sugar production has risen from 55 percent in the early 1970s to about 85 percent in the early 1990s, dropping to 75 percent recently because of lower U.S. sugar production.

Cane refining capacity, however, is poised for expansion. Capacity utilization in major refineries in 1996/97 has been close to the limit, at times operating above the 300 days per year rate and helping keep refined sugar prices at the highest levels since 1990. In Florida, a cane milling company has recently announced the building of a sugar refinery to be operational in 1998. Eventually the refinery is reported to reach an annual capacity of about 600,000 tons of refined sugar, equivalent to adding about 9 percent to total U.S. refining capacity of 6.8 million tons of raw sugar per day (7.125 million, including Puerto Rico and the cane co-processing unit of a beet processor). Additional refining capacity appears in prospect with the application of membrane filtration technology to provide direct refined sugar at the raw cane mill.

The dynamism of the sugar industry is manifest in the consolidation of industry through cane refining company acquisitions of beet processing and corn wet millling; strengthened strategic marketing through creation of joint selling and larger storage capacities; and strengthened financial structure through formation of grower cooperatives. The cooperatives have the virtue of a greater assurance of getting sufficient supply of the crop (this is especially relevant in beets), more flexibility in the allocation of returns between growers and processors (they are one and the same) and therefore can more aggressively discount sugar prices while avoiding anti-trust concerns, and also enjoy certain tax advantages. One beet processing company has recently been

bought up by its growers, and another beet processing cooperative is starting up.

Cost of Production

In both raw cane sugar and refined beet sugar production and processing, average costs per pound of sugar have generally declined in the past decade through the 1995 crop, despite price inflation. The one exception is Hawaii, and its cane sugar production has declined to less than half its traditional output of 1 million tons of raw cane sugar per year.

On a cents-per-pound basis, Eastern beet sugar production costs dropped from 21.8 cents a pound in 1982-84 to 20.1 cents in 1992-95, a decline of about 8 percent. The Western area is generally irrigated and higher-yielding but also higher-cost. The Western average cost was 24.4 cents a pound in 1982-84, and dropped only 4 percent to 23.5 cents a pound over 1992-95. Sugarbeet acreage has shifted east reflecting the lower costs, with the Eastern region share rising from 46 percent to 55 percent of the national total in a decade.

While national average costs are down in cents per pound of sugar, costs per acre have been rising. This indicates that sugar per acre has risen faster than costs per acre. For example, the 1982-84 average beet sugar per acre yield was 2.6 tons, while the 1992-95 average was 3.0 tons per acre, a rise of 15 percent.

The lowest-cost State for raw cane sugar production is Florida, which averaged 19.8 cents a pound, raw value, for both the 1982-84 and 1992-95 periods. While costs are sometimes shown on a dollars per acre, or dollars per ton of sugarcane, the focus of the producer is really to minimize cost on a cents per pound of sugar basis. Florida's yield of sugar per acre in 1982-84 was 3.6 tons, but in 1992-95 averaged 4.12 tons an acre, and was never below 4 tons.

Louisiana and Texas costs are now combined for statistical reasons, and for the 1992-95 crops for the combined region averaged 19.9 cents a pound, not much different from Florida. In the 1982-84 period, Louisiana had averaged 21.4 cents a pound, and Texas 27.2 cents a pound. Louisiana's yield has risen from an average of 2.5 tons of sugar, raw value, per acre in 1982-84 to 2.70 in 1992-95, an 8 percent increase. (This does not include the 1996 Louisiana crop, which set a record of over 3.1 tons of sugar per acre.) Sugar per acre in Texas averaged 2.3 tons in 1982-84, but had risen to 3.4 tons in 1992-95, a rise of 48 percent.

Hawaii has usually been the highest-cost State, and in 1992-95 costs averaged 26.2 cents a pound of sugar, raw value, up from 23.8 in 1982-84. Sugar yield was 11.4 tons per acre in 1982-84, but had dropped 9 percent to 10.4 tons in 1992-95 -- the only State to show a decline in sugar per acre over the decade.

Given a highly competitive domestic market, U.S. sugar companies cannot afford to be complacent either among each other or against other sweeteners. Sugar consumption suffered a spectacular fall from 10.9 million tons in 1976 to 7.8 million in 1986 when lower-priced HFCS

edged out sugar in liquid applications (primarily soft drinks and beverages). Crystalline fructose has been nibbling at the edge of sugar's markets but at the moment, given its relatively high cost and price, is confined to niche markets. Corn wet millers, however, have expanded capacity to where prices are very low, increasing the pressure to further stretch HFCS's technical limits to bite into sugar's market through incremental substitution or new products. (More on HFCS later in our presentation.)

Toward A More Market-Oriented,Sugar Industry

WTO. During the Uruguay Round of multilateral trade negotiations, as part of the general movement to eliminate non-tariff barriers (e.g. quotas), the United States and its trading partners put into place the process of tariffication; that is, replacing a non-tariff barrier with its tariff equivalent on quantities above a minimum access commitment. The result is the tariff-rate quota--a quantity admitted at a low duty with additional quantities at a duty high enough to replace the NTB. Over time the higher duty is reduced and the "in-quota quantity" is increased, leading to gradual liberalization.

For sugar, the United States committed in its WTO schedule to an in-quota quantity of no less than 1.139 million metric tons, raw value (1.117 million for raw sugar and 22,000 for refined and specialty sugars), or 1.256 million short tons. This is only marginally above the 1.25 million short tons which effectively served as a minimum under the 1990 Farm Act, and compares with the U.S. tariff-rate import quota average of 1.34 million short tons for fiscal years 1993-1995 and a level of less than 1 million short tons in some years in the late 1980's. The high-tier tariff which applies to over-quota sugar imports is being reduced to 15.36 cents a pound by the year 2000; such a tariff would fail to support a domestic price of 22 cents per pound only if the world price fell below 6 cents--which is highly unlikely. While the process of formal liberalization proceeds gradually, the US import system permits market forces within the United States to impact on market access: the TRQ for fiscal 1996 was well over 2 million short tons, and the fiscal 1997 TRQ will remain close to that level.

NAFTA. The agriculture and sugar provisions of the NAFTA differ with respect to Canada and Mexico. Canada, which supplies refined sugar, is now subject to the 22,000-metric-ton global tariff-rate quota on refined sugar. The low-tier duty is being phased down to zero by January 1, 1998, as provided in the U.S.-Canada Free Trade Agreement incorporated into the NAFTA. The duty on HFCS will also be eliminated by that date. The agreement with Mexico provides for eventual complete and reciprocal liberalization during a staged transition period which ends in the year 2008.

Canada has seen its export of refined sugar to the United States drop from the early part of this decade when it shipped over 30,000 metric tons a year. Mexico, on the other hand, has achieved the status of a net surplus producer for the 1996/97 tariff-rate quota year, producing more than it

consumes, and can therefore ship 25,000 metric tons, raw value, of sugar duty-free to the United States, in either raw or refined form.

1996 Farm Act. The Federal Agriculture and Reform Act of 1996, signed into law on April 4 last year made significant changes to the sugar program, lowering support levels, reducing Government involvement, and putting sugar producers and processors on a higher risk, more market-oriented position. Support was lowered by:
--freezing loan rates at 1995 levels of 18 cents per pound for raw cane sugar and 22.9 cents per pound for refined beet sugar;
--making nonrecourse loans conditional on a minimum TRQ import above 1.5 million short tons, raw value;
--increasing the cost of loans by charging 1 percentage point above the Commodity Credit Corporation's cost of borrowing from the Treasury ;
--increasing marketing assessments 25 percent to 0.198 cents per pound for cane sugar and 0.2123 cents per pound for refined beet sugar;

Most importantly, the authority to impose marketing allotments was suspended, eliminating limits on the sale and thereby the production of domestically produced sugar. The role of Government in price support has been confined to the loan program and the TRQ. Allotments also ceased on sales of crystalline fructose.

With the greater opportunity to produce, the 1996 Act also has raised risk. If the TRQ is set at or less than 1.5 million short tons, loans are recourse, which means that the borrower (sugar processor) would have to repay the loan in cash. With nonrecourse loans, the borrower can choose to forfeit the sugar he used as loan collateral and satisfy payment regardless of the price of the sugar in the market (the Government would have no recourse but accept).

Even with a nonrecourse loan, the the 1996 Act now imposes a 1 cent per pound penalty for forfeiture, effectively lowering price support by 1 cent. The grower faces greater risk too, through suspension of a legislative provision that, in the event of processor bankruptcy, the Government would ensure farmers receive minimum grower payments.

First Year of the 1996 Farm Act: Fiscal 1997

Production. USDA each month estimates US sugar supply and use for the current fiscal year. The February report estimates fiscal 1997 production at 7.29 million short tons. Beet sugar production is projected to be 55 percent of the total, at 4 million tons, slightly below last year and the second consecutive poor crop after the record 4.5 million tons in fiscal 1995. Beet sugar's share of consumption rose from 35 percent in the early 1980's to about 45 percent in the early 1990's, dropping to about 40 percent after 1995 as bad weather and lower acreage cut U.S. output.

Sugar beet acreage expanded from about 1 million acres in the early 1980's to the 1994/95 peak of 1.44 million acres, as the U.S. sugar program provided relatively stable prices while productivity gains lowered costs and raised yields. In 1996/97, harvested sugar beet area was only 1.32 million acres, with much of the 120,000-acre decline resulting from farmers switching to corn, wheat, and other commodities that commanded high prices in 1996.

The average sugar beet yield is forecast at 20.2 tons an acre in 1996/97, comparable to the average of recent years. Although wet weather hampered field work last spring and some planting was as late as any year on record, good weather in the fall allowed yields to recover.

Cane sugar production in fiscal 1997 is forecast at 3.29 million tons, raw value, down from 3.45 million last year and the record of 3.57 million tons in 1994. Florida, which produces more cane sugar than any other State , is forecast to produce 1.76 million tons, about the same as last year and close to the 5-year average. This level of output would be about 54 percent of U.S. cane sugar output. Although Florida's sugarcane yield is projected to be 34 tons an acre, down from 34.6 tons last year, sucrose content of the cane is reported to be higher than last year, yielding about the same volume of sugar an acre. The area harvested for sugar in Florida is 420,000 acres, up slightly from last year.

Sugarcane acreage in Florida expanded to a peak of 428,000 acres in 1991/92, and since then has varied little. Freezes in January this year put some of the crop at risk, but it appears most of the cane will be harvested and production is not likely to be affected. However, freeze damage to sugarcane plants needed for planting new fields may have been extensive, which could affect the 1997/98 crop. Florida plans to finish harvesting by mid-March.

Louisiana is the second-largest producer of cane sugar, and usually harvests during a short season between October and December. The current crop continued to be harvesed into the first week of January, and total production was 1.045 million tons, not far from the record 1.06 million tons last year.

A freeze in Louisiana in early 1996 damaged many acres which had to be abandoned, and early forecasts assumed a lower crop. But fall weather was excellent, the sugarcane was able to continue adding sugar, and the abandoned fields would have been the lowest yielding, so that the final average yields were 27 tons an acre, 2 tons higher than expected earlier in the fall. Two new varieties were helpful, with some fields getting over 50 tons an acre.

Louisiana harvested 335,000 acres of sugarcane, down from record of 368,000 acres in 1995/96, with much of the decline due to abandonment of freeze-damaged fields. Sugar yield was a record 3.12 tons an acre, far above the previous high of 2.9 tons in 1994/95. The fields intended for harvest in 1997 have survived the freezes up to the middle of February and look promising for a good crop.

Hawaii's sugar production has been declining for a decade. Its last 1-million-ton crop was in 1986

and the forecast is for another year of decline, to 370,000 tons this year. Costs for land, labor, transportation of sugar to the mainland, and environmental compliance are high. Six of 12 mills have closed since 1992, with 2 mills closing in 1996. Some of the remaining mills appear to be in precarious financial position.

Sugarcane in Hawaii is grown for almost 2 years before being harvested, so cane yields--forecast at 87 tons an acre this year--are among the highest in the world. Sugar yield is forecast at 10.9 tons an acre, up slightly from recent years but lower than the yields of over 12 tons of sugar an acre in the mid-1980's.

Texas is forecast to produce 85,000 tons of cane sugar in fiscal 1997, down from levels of over 100,000 tons of sugar in the last 5 years, and far below the record 146,000 tons in 1995. Water has been very short this season, and even with recent rains, there was not enough moisture for a good crop.

USDA will provide its first survey of sugar beet acreage for the 1997/98 crop in the *Prospective Plantings* report scheduled for release March 31. Sugar beet acreage was down in 1996/97 in part because of the high prices of alternative crops, and reduced sugar beet prices in the previous year. Refined beet sugar prices--the basis for sugar beet grower returns--had averaged 25.3 cents a pound (bulk, Midwest, f.o.b. factory) in fiscal 1995, the fourth straight year in a narrow range of 24.5 to 25.6 cents. Prices have been 29 cents or higher for over a year, and the last sugar beet payments for many farmers were higher than the previous year. Overall, conditions in early 1997 indicate that total U.S. sugar beet acreage is likely to rise in 1997/98. Sugarcane acreage, on the other hand, may rise in Louisiana, remain stable in Florida and Texas, and fall marginally in Hawaii.

Loan Participation. The 1-percentage point increase in loan rates required by the 1996 Farm Act for sugar beet and sugarcane processors who borrow from the Commodity Credit Corporation has had a significant effect on loan activity. Higher beet sugar prices may also have been a factor. At the end of January 1997, 688.323 million pounds of beet sugar are under loan, only 37 percent of the volume last year. Only 424.392 million pounds of cane sugar are under loan, 52 percent of last year's volume. Processors currently have more sugar in storage than last year at this time but are financing their inventories with private funds. Processors also appear to be keeping their loans for shorter periods than last year. Beet processors had repaid only 9 percent of their loans by the end of January 1996 compared with 30 percent this year.

Consumption. U.S. sugar consumption for fiscal 1997 is forecast at 9.8 million tons, up 2.6 percent or 246,000 tons from 1996. Sugar deliveries in August and September 1996 were curtailed by short beet sugar supplies, and the 1996/97 forecast assumes that part of the shortfalls were made up by higher deliveries in the October-December quarter. Even then, deliveries were weaker than anticipated and therefore USDA in early February reduced its forecast deliveries by 100,000 tons from the previous 9.9 million.

Trade, Stocks, and Prices. The USDA on September 13, 1996 announced a fiscal 1997 tariff-rate import quota (TRQ) for raw sugar of 2.300 million metric tons (2.535 million short tons), raw value. With the refined sugar TRQ, including specialty sugar, of 22,000 metric tons (24,250 short tons), the total TRQ was set at 2.322 million metric tons (2.560 million short tons).

The raw sugar TRQ was established under a new administrative plan, with an initial allocation of 1.874 million short tons. Three additions to the TRQ of 220,462 short tons each would be allocated in January, March, and May 1997, if the 1996/97 ending stocks-to-use forecast in USDA's *World Agricultural Supply and Demand Estimates* report for those months is less than or equal to 15.5 percent. Because the January stocks-to-use percentage was 15.6, the allocation of 220,462 tons (rounded to 221,000 in our table) was cancelled. Including an estimated shortfall in the fiscal 1997 TRQ of 70,000 short tons, the current estimate of sugar imports for consumption is 2.269 million tons.

Imports under the reexport program are estimated at 450,000 short tons in fiscal 1997, down from 530,000 last year. Exports are estimated at 250,000 tons, the lowest level since 1983. There is less incentive to export this year because of relatively high refined sugar prices in the U.S. market and because the refined premium on the world market is much lower than last year.

U.S. raw sugar prices (nearby futures, c.i.f., duty-paid, Contract No. 14, New York) averaged 22.21 cents a pound in the October-December quarter, easing to 21.88 cents in January. February prices through the 19th averaged 22.07 cents, reflecting cancellation of the TRQ allocation in January (though much of that had been fairly well anticipated). Futures prices for 1997 are relatively flat, with the further futures somewhat higher than the nearby futures. Over the 10 fiscal years through fiscal 1996 raw sugar prices averaged 22.16 cents a pound.

Refined beet sugar prices averaged 28.84 cents a pound in fiscal 1996, driven up from 25.26 cents the year before primarily by the downturn in beet sugar production from the record 1995 output. Prices have held at 29.00 cents since August 1996, though some spot market sales reportedly have been below 29 cents. Refined prices over the past 10 fiscal years averaged 26.30 cents a pound, ranging from 23.70 cents in 1987 to 30.16 cents in 1990.

CORN SWEETENERS

World high fructose corn syrup (HFCS) production exceeded 10 million metric tons, dry basis, for the first time in 1996. Thus world consumption of both sugar and HFCS together was about 125 million metric tons, with HFCS representing about 8 percent of the combined consumption. The United States still accounts for about three-fourths of world HFCS consumption. World HFCS consumption growth has averaged 4.5 percent annually for the last 10 years, compared with sugar's consumption growth rate of 1.5 percent annually. HFCS constitutes a significant share of sweetener consumption in Canada, Japan, South Korea, Taiwan, and Argentina, and is expected

to soon find a large market in Mexico.

HFCS represents about 47 percent of the combined sugar and HFCS consumption in the United States, rising from about 42 percent a decade ago. Consumption of HFCS in fiscal 1997 is forecast at 8.36 million tons,dry basis, up 4.7 percent. Domestic per capita HFCS use is forecast at 61.6 pounds, up from 59.4 pounds last year and 49.3 pounds in fiscal 1991.

HFCS production capacity in the United States has grown dramatically in recent years. Some of the increase was likely in anticipation of a larger Mexican market, but the Mexican peso devaluation since 1994 made U.S. products more expensive, while the recent economic contraction in Mexico disrupted trade. Thus HFCS capacity growth has outpaced domestic demand growth, and as a result prices are soft.

A new corn wet milling company started production in North Dakota in late 1996. With a daily grinding capacity of 85,000 bushels of corn, this factory represents an increase in U.S. production capacity of 4 to 5 percent. The company is a cooperative, with over 2,000 corn farmer members, some of whom also grow sugarbeets.

U.S. HFCS production in fiscal 1997 is forecast at 8.40 million tons, dry basis, up 3.7 percent from 8.11 million tons in 1996 and accounting for about 67 percent of expected total corn sweetener production for the coming year. Corn sweeteners (HFCS, glucose, and dextrose) are forecast to use a record 750 million bushels of corn, up 4.3 percent from fiscal 1996, and representing about 11.3 percent of the corn crop.

U.S. exports of HFCS to Mexico in fiscal 1996 rose to 78,000 metric tons, dry basis, from 50,000 tons the year before and only 9,000 tons in 1991, according to the U.S. Census Bureau. Prior to 1984, U.S. exports of HFCS to Canada exceeded those to Mexico, and Canada is still the largest destination for U.S. exports of glucose and dextrose.

The NAFTA-based Mexican import tariff on U.S. HFCS was scheduled to fall to 9 percent in 1997, and decrease by 1.5 percent each year to zero in 2003. However, the Mexican Government increased the duty on U.S. HFCS to 12.5 percent effective in late 1996, an anti-dumping reaction to a U.S. increase in duties on Mexican broomcorns. Separately, preparation of an anti-dumping petition by Mexican sugar producers against U.S. HFCS is being reported in the press, but no official anti-dumping investigation has begun.

Mexican demand for HFCS is growing as bottlers, especially close to the U.S. border, adopt new technology to handle liquid sweeteners. It appears that the major Mexican soft drink bottlers are adopting a "go-slow" approach to switching to HFCS, but smaller brands seem to be moving more quickly.

U.S. SUGAR: LONG-TERM PROJECTIONS TO FISCAL 2003

The USDA Baseline projections we are presenting to you this year are different from those last year partly because of a different program framework, the 1996 Farm Act which extends for 7 years to fiscal 2003.

Under the new farm act, the removal of production constraints through elimination of marketing allotments liberates sugar producers and is certainly expansionary. On the other hand, the freedom to farm in the new farm act is accompanied by a reduced effective level of price support and increased risk to the business of producing and processing sugar. In weighing these and other factors, we have had to rely on our best informed judgment, based on a constant process of visiting with and observing the industry, its plans for expansion and innovation, expenditures for plant and equipment, technological advances, and areas of concern. We looked at competitiveness, alternative crops, opportunity cost, and potentials of sweetener substitutes.

What we have come up with in this set of projections compared with last year is: continued growth of production but at a slower rate, consumption rising slightly faster, and imports for domestic consumption (TRQ) significantly larger. The raw sugar price (New York Contract #14) averaged 22.50 cents a pound in fiscal 1996, and is projected to average 22.00 cents through the remainder of the Baseline. Grower prices for sugar beets and sugarcane derive from the raw sugar price, which is based on a cane sugar loan rate of 18 cents a pound, raw value.

Production. U.S. sugar production is projected at 7.87 million tons in fiscal 2003, up 8 percent from 1997 but 680,000 tons (beet 500,000 tons) less than projected last year. We have a more conservative estimate of beet sugar production growth as a result of our reassessment of the potential for increased acreage; recent closure of 4 beet sugar factories in California, Nebraska, and Ohio; and the loss of the Canadian market because of anti-dumping duties. We have also moderated our estimate of cane sugar output because of a sharper drop in Hawaii production and a cutback in Florida output (from funds earmarked for Everglades restoration in the Farm Act).

Sugar beet area harvested is down 6.5 percent in 1996/97 because of poor weather, higher prices for alternative crops and low returns to sugar beets last year. Acreage is projected to rebound by 1998/99 to 1.42 million acres, and rise 15,000 acres a year afterwards, reaching 1.475 million acres in 2002/03. That is not much higher than the record 1.443 million acres in 1994/95 and is 55,000 below last year's projected figure.

A new beet sugar processing facility is scheduled to open in the State of Washington in 1998 (the first new factory in the United States since 1975) but the gradual shift of acreage from higher-cost areas to lower-cost non-irrigated areas will continue. Thirty years ago California was harvesting 300,000 acres of beets, only half of that by 1992, and less than 100,000 this year because of competitive crops, plant diseases, and water problems. In Ohio, a factory suspended operations last year and appears unlikely to resume, as many farmers are now shifting to other crops such as

beans, and selling their specialized beet equipment. Yields in Ohio have been declining in recent years and Ohio's beet acreage has trended down from about 21,000 acres in 1992/93 to 4,000. Beets from the residual area (where yields are better) have been transported to Michigan factories for processing. Michigan's beet area which had stabilized at nearly 190,000 acres is down to 13,000 acres in 1996/97. Michigan's sugar beet processing company has contracted with Canadian growers for about 3,000 acres of beets. Reportedly, one of the 4 factories in Michigan may close.

Beet sugar production in the period 1981-1996 increased on trend at 95,000 tons a year. Our current projection has production rising 60,000-70,000 tons a year after fiscal 1998, reaching 4.55 million in fiscal 2003. That level compares with last year's projection of 5.05 million tons, and is only slightly above the 4.493-million-ton record of fiscal 1995. The combination of a rising beet sugar recovery rate (on trend) and stagnant sugar beet yields per acre (also on trend) results in a slowly rising yield of beet sugar per acre. We have assumed that desugaring of molasses--which raises beet sugar yield per ton of beets by about 10 percent--adds a net of 290,000 tons by 1998, increasing thereafter at 10,000 tons a year.

Sugarcane acreage over the next several years will reflect a balance between a projected decline followed by stability in Hawaii and Florida, and continued growth in Louisiana. Total area in sugarcane is projected to drop from 893,000 acres in fiscal 1996 to 849,000 in 1999, then rise slowly to 878,000 in 2003, which would make it 30,000 acres below last year's projection. As acreage has declined in Hawaii, national average yields have fallen, because Hawaii's yields are much higher than those in other States. After 2000, national average yields stabilize, as research and development create better varieties and Hawaii's acreage stabilizes. The cane sugar recovery rates rise on trend.

In Florida, some land is assumed to be taken out of cane for Everglades restoration purposes. From current levels of about 420,000 acres, area harvested for sugar declines to 390,000 by the year 2000 and then stabilizes. Louisiana's sugarcane area increases from fiscal 1997's freeze-reduced 335,000 acres to 410,000 acres in 2003. Some of this additional area is expected to come from pasture and rice lands in Western Louisiana.

Cane sugar production in 1981-1996 increased on trend at 35,000 tons a year. Our projection has production declining to 3.170 million tons by fiscal 1999, stabilizing, and rising slowly 40,000-60,000 tons a year and reaching 3.32 million in 2003. That level compares with last year's projected 3.500 million tons, and the 3.565-million-ton record of 1994. Florida's production declines from 1.76 million tons in 1997 to 1.67 million in 2000, then rises slowly to 1.72 million in 2003 as yields and recovery rates rise on trend. Louisiana's production rises to 1.16 million tons by 2003, from about 1 million tons in fiscal years 1995 to 1997. Production in Texas is relatively stable and projected at 150,000 tons. The Puerto Rican sugar industry continues to decline.

Domestic disappearance is projected to rise about 150,000 tons a year from 1996 to 2003. Per capita sugar disappearance rises from 66.5 pounds, refined basis, in 1996 to 69 pounds in 2003.

The rapid substitution of corn sweeteners (HFCS) for sugar ended about 1986, and since then consumption has grown at about 2 percent a year, compared with about 4 percent for HFCS. The projected growth rate of sugar consumption is 1.4 percent a year from 1996 to 2003, lower than the recent trend, in part because of continued substitution of other sweeteners, including low-calorie sweeteners, and the near-saturation of the sweeteners market. HFCS consumption will continue to grow more rapidly than sugar, and will likely overtake sugar consumption in about 8 years.

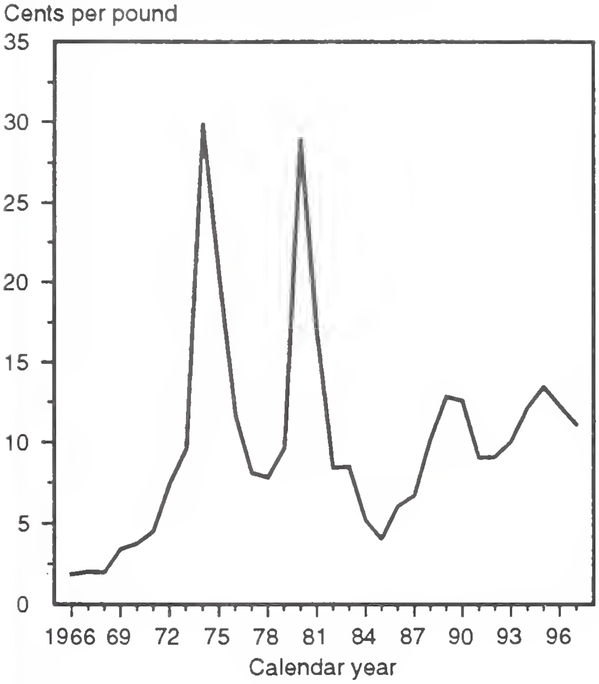
Sugar imports for consumption (TRQ and very small amounts of high-duty sugar) are projected to reach 2.62 million tons by fiscal 2003. This is about 980,000 tons above last year's projected figure, reflecting the slower growth in production and slightly higher consumption. While imports are shown to remain above the level of 1.5 million tons necessary to assure price support, normal variations of production will likely result in high variation in actual import needs over the projection period. Therefore, one cannot rule out the possibility of a TRQ below 1.5 million tons in some years, with the sugar loan program being recourse.

CONCLUSION

Seven years ago at USDA's 1990 Outlook, one of our speakers was Bill Shanley, President of Amstar (now Domino) Sugar Corporation. Mr. Shanley declared that the segments of the industry, "cane and beet processors, cane sugar refiners and corn sweetener producers" were now "healthy, stable, and well balanced", as if to say it's now time to live-and-let-live. That line of thinking led to marketing allotments in the 1990 Farm Act. It didn't work. Personalities, ambitions, and competition have a way of emerging out of market-sharing arrangements.
In place of controls, the 1996 Farm Act, the NAFTA, and the WTO are all expressing a different direction, toward a more free market.

Figure 1

World Raw Sugar Price



1997 January only.

Figure 2

U.S. Sugar Consumption, Production, and Quota Imports

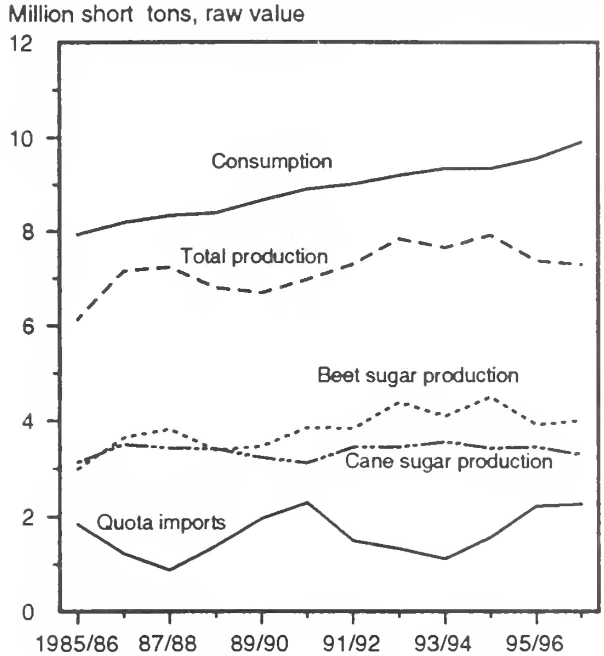
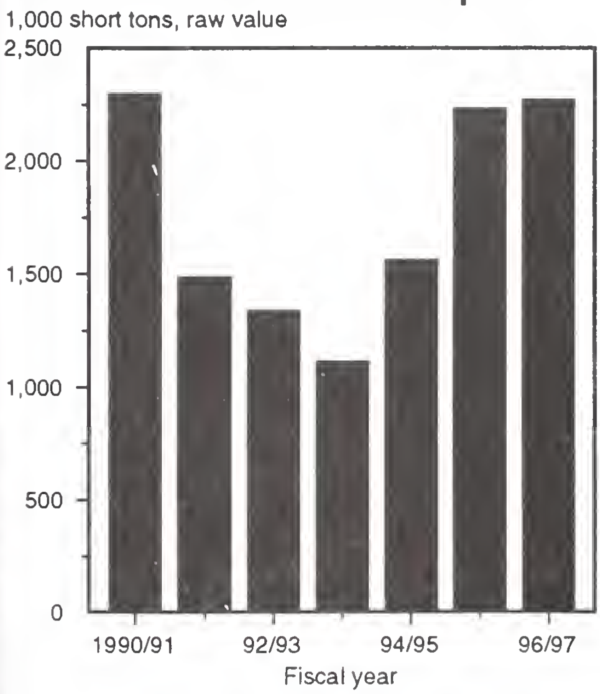


Figure 3

U.S. Tariff-Rate Quota Imports*



*Corresponds to imports for consumption.

Figure 4

U.S. Raw Sugar Prices

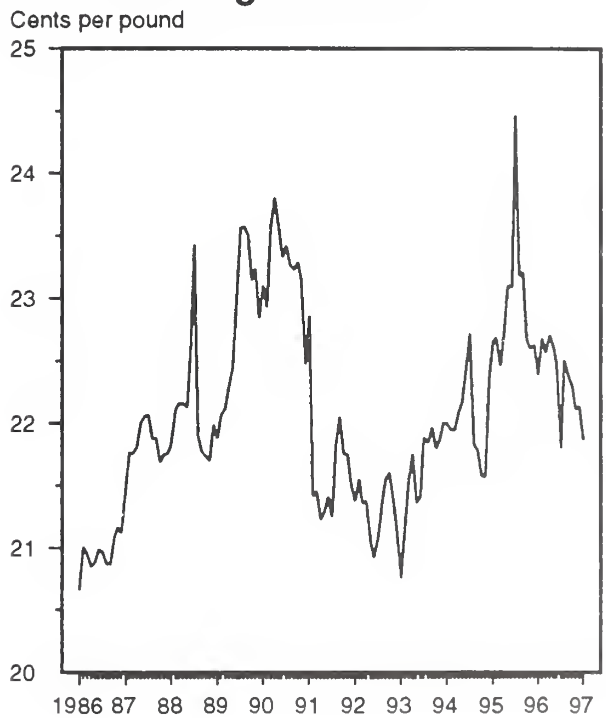


Figure 5

U.S. Wholesale Refined Beet Sugar Prices

Cents per pound

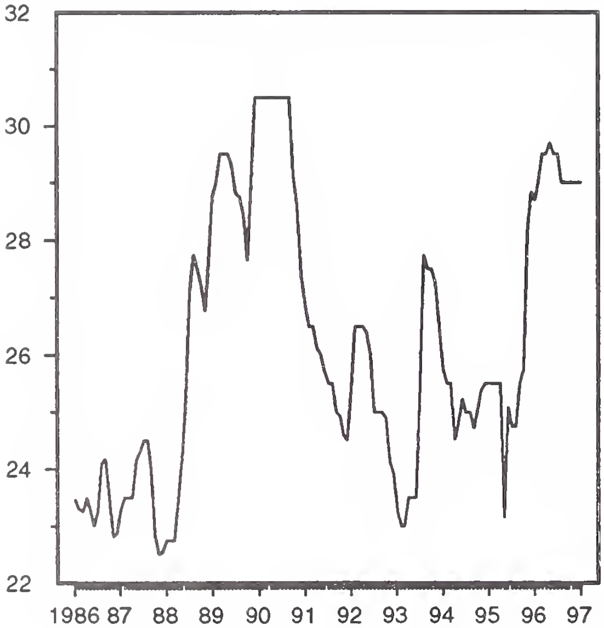
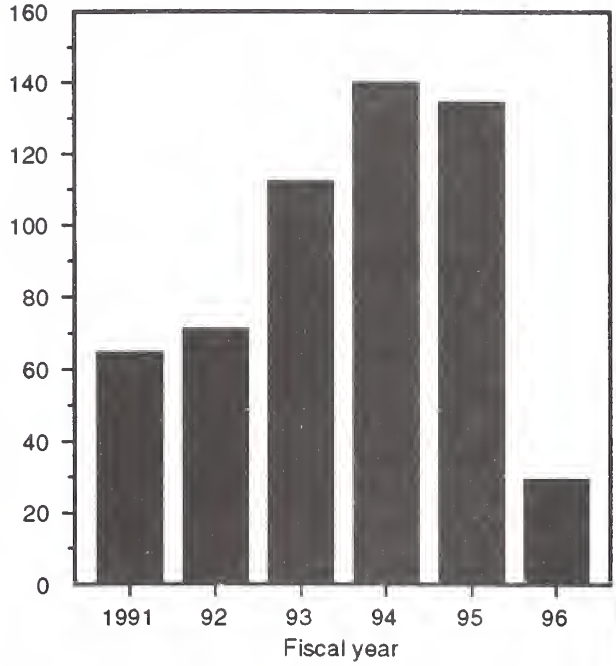


Figure 6

U.S. Sugar Exports to Canada

1,000 metric tons

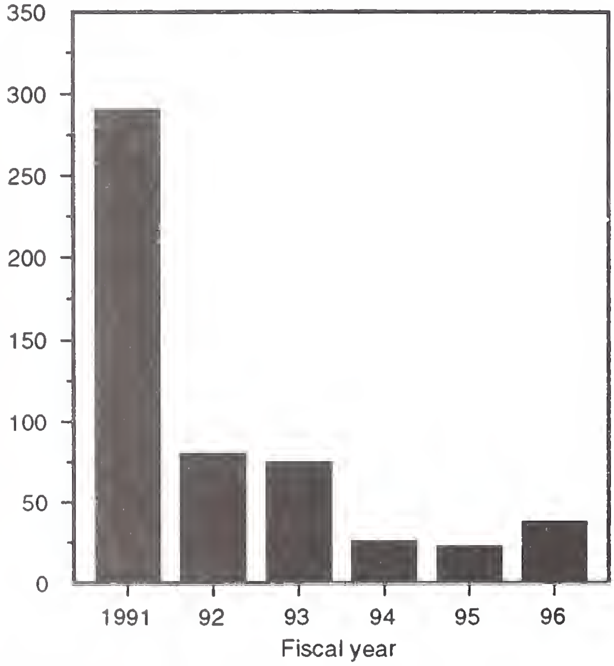


Source: U.S. Census.

Figure 7

U.S. Sugar Exports to Mexico

1,000 metric tons



Source: U.S. Census.

Figure 8

U.S. Sugar Consumption

1,000 short tons, raw value

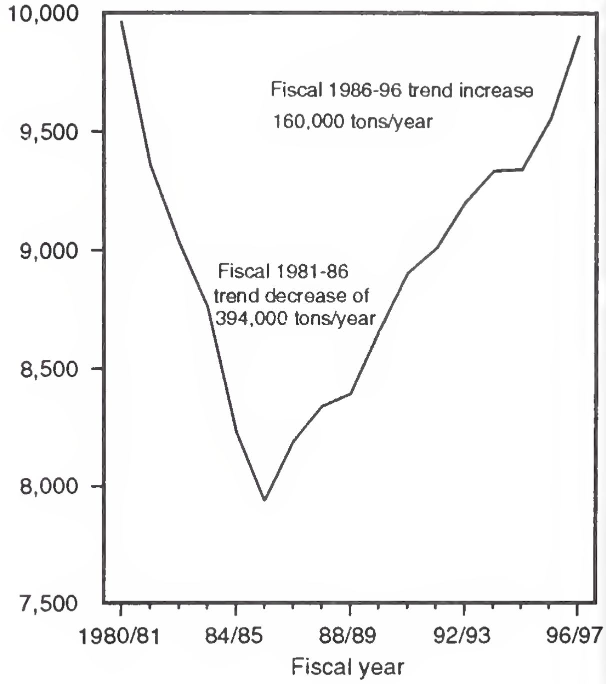
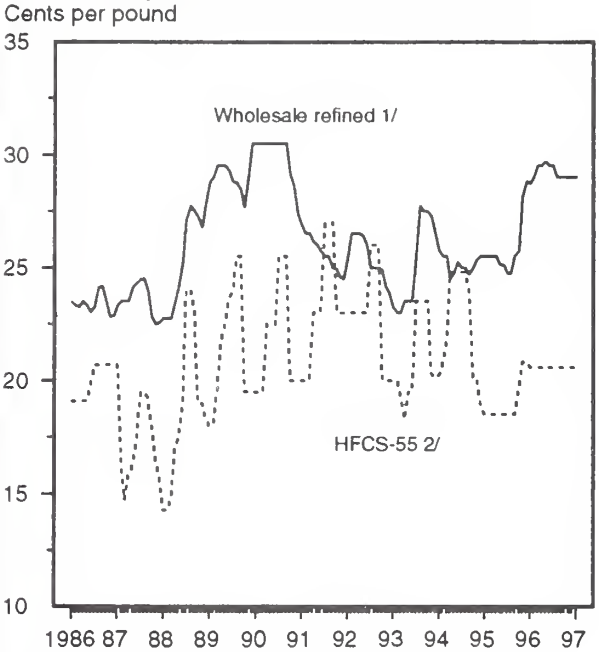


Figure 9

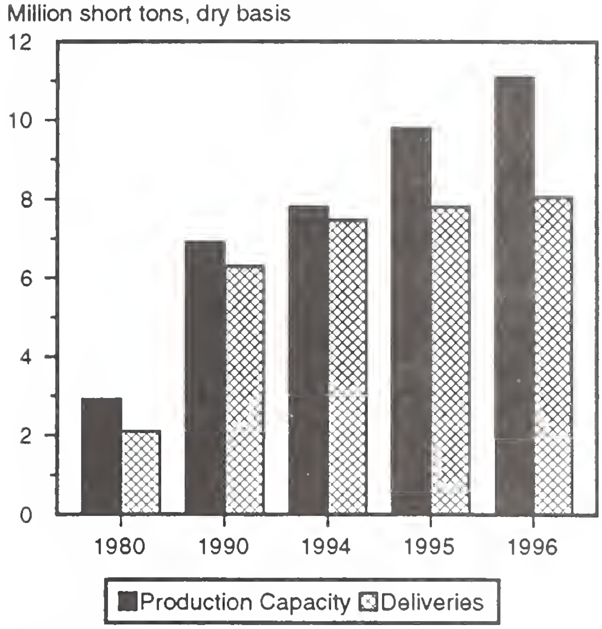
U.S. Sugar and HFCS Prices*



1/ Midwest beet sugar, f.o.b. factory.
2/ Dry basis.

Figure 10

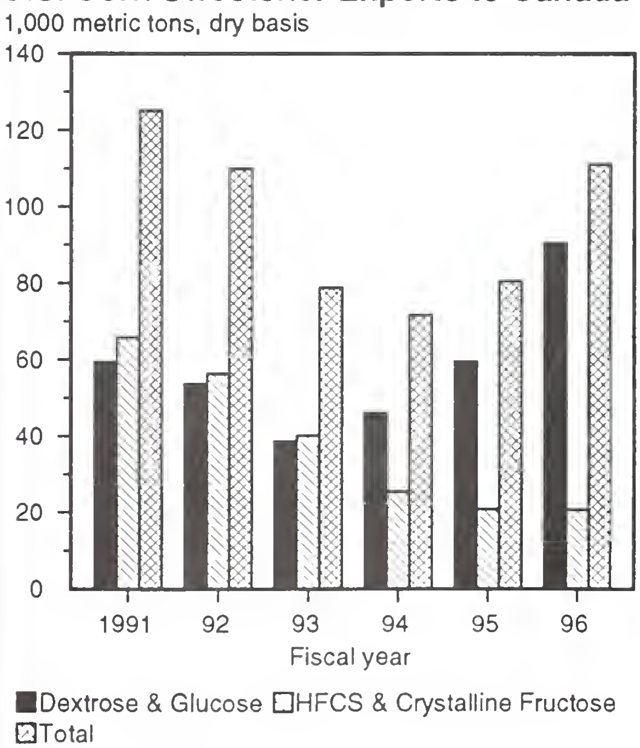
U.S. HFCS Deliveries, and Production Capacity



Source: USDA/ERS

Figure 11

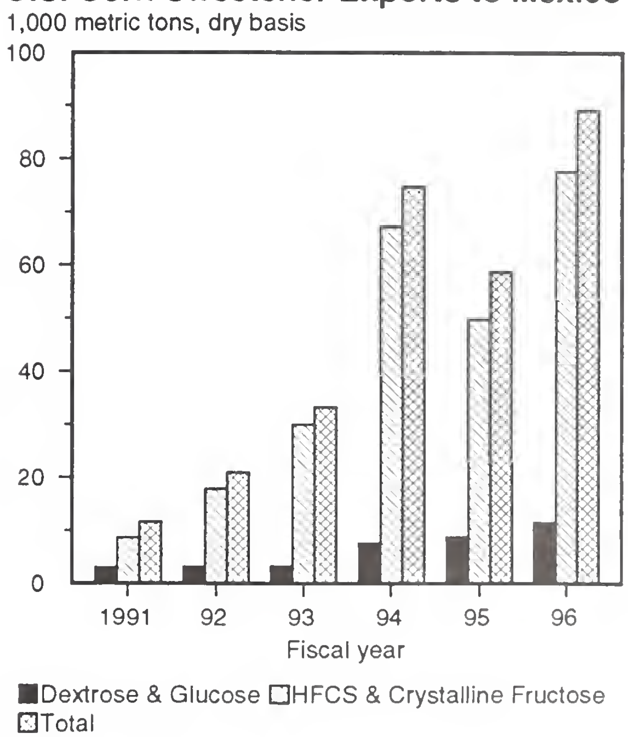
U.S. Corn Sweetener Exports to Canada



Source: U.S. Census.

Figure 12

U.S. Corn Sweetener Exports to Mexico



Source: U.S. Census.

Figure 13

U.S. Sugar Production, Consumption, and Quota Imports Projections

1,000 short tons, raw value

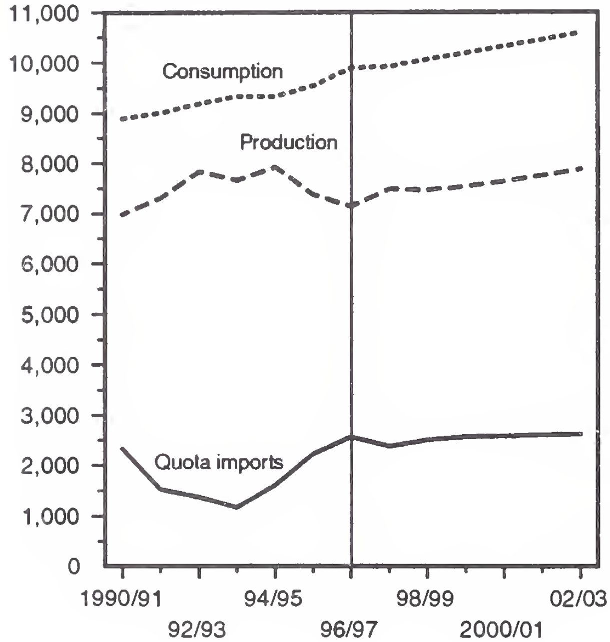
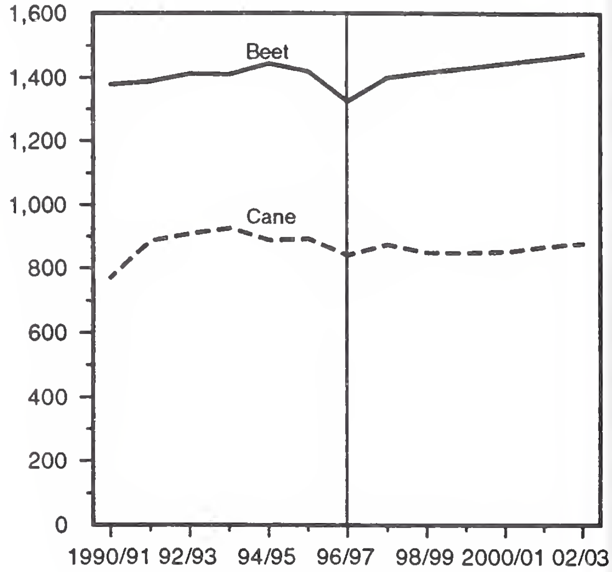


Figure 14

U.S. Sugar Beet and Sugarcane Acreage

1,000 acres



*Corresponds generally to previous crop year.

Figure 15

U.S. Beet Sugar Production

1,000 short tons, raw value

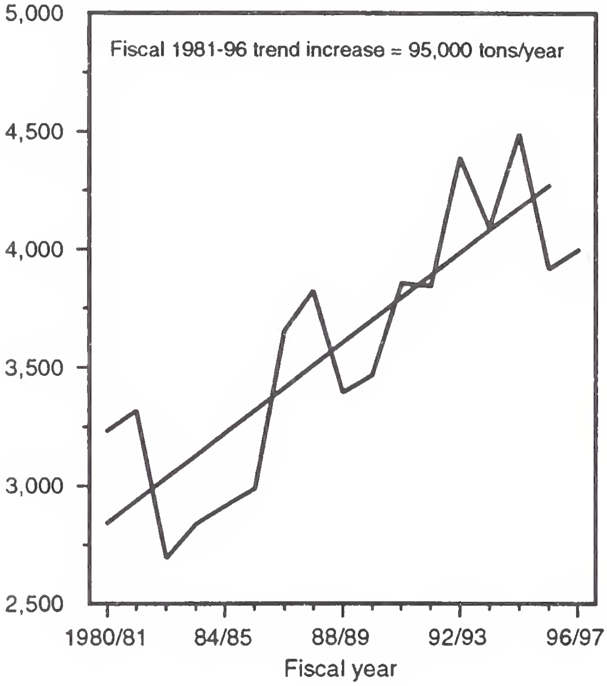


Figure 16

U.S. Beet Sugar Production Projection

1,000 short tons, raw value

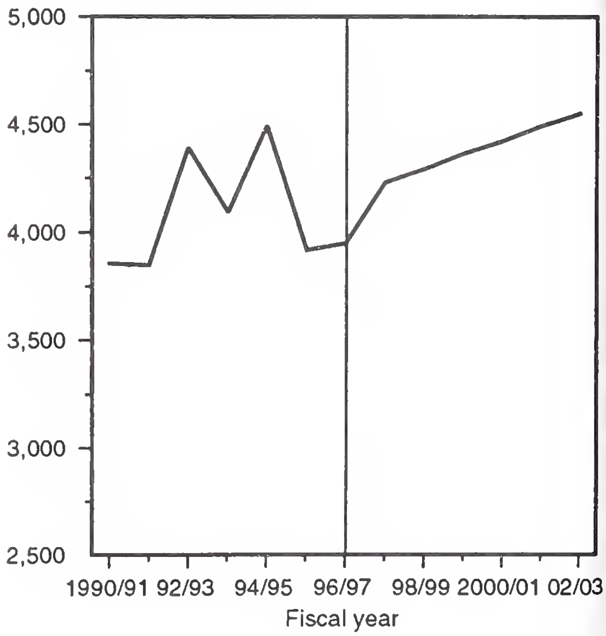
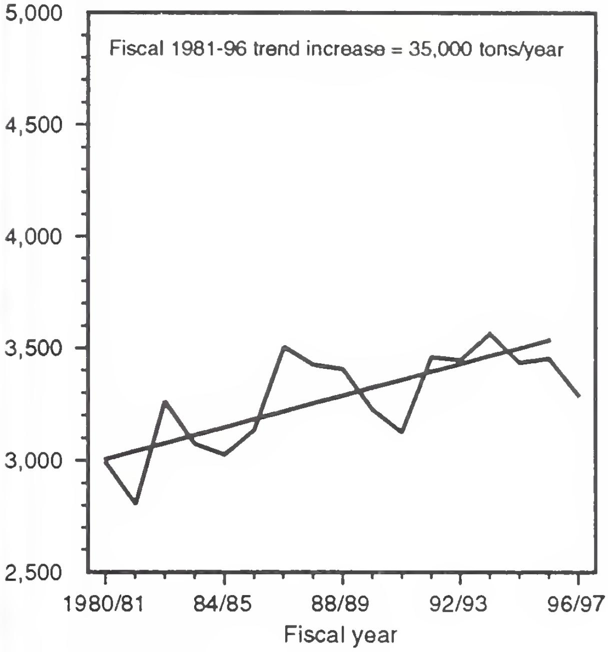


Figure 17

U.S. Cane Sugar Production*

1,000 short tons, raw value

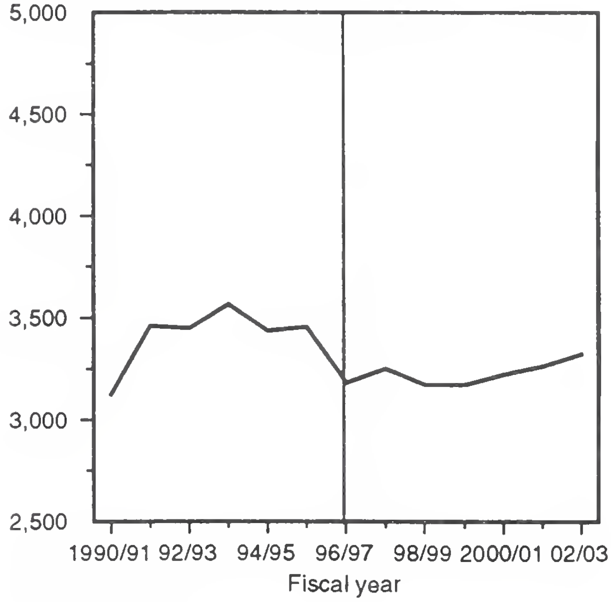


*Includes Puerto Rico.

Figure 18

U.S. Cane Sugar Production Projection*

1,000 short tons, raw value



*Includes Puerto Rico.

Figure 19

Florida and Louisiana Cane Sugar Production Projections

1,000 short tons, raw value

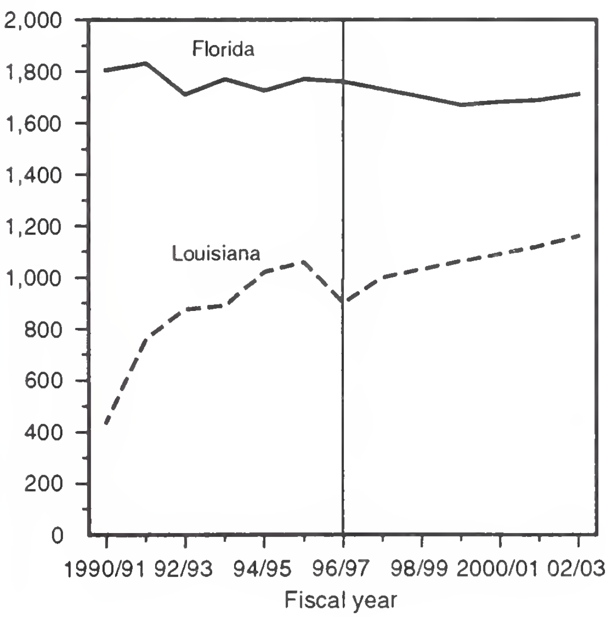


Figure 20

Hawaii and Texas Cane Sugar Production Projections

1,000 short tons, raw value

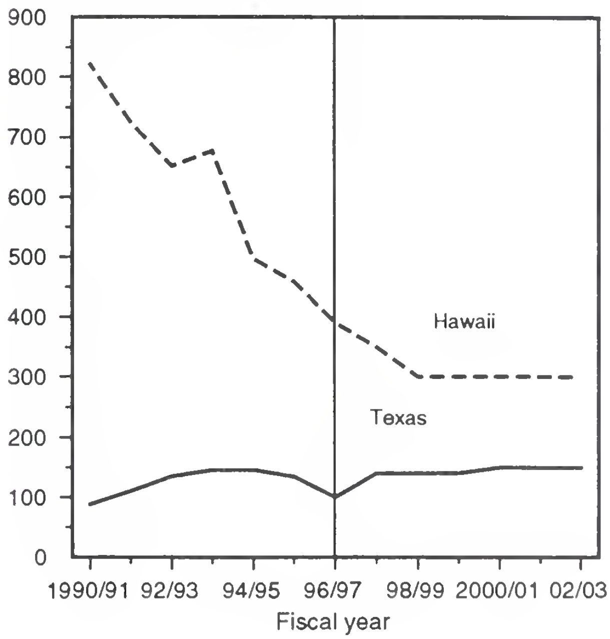
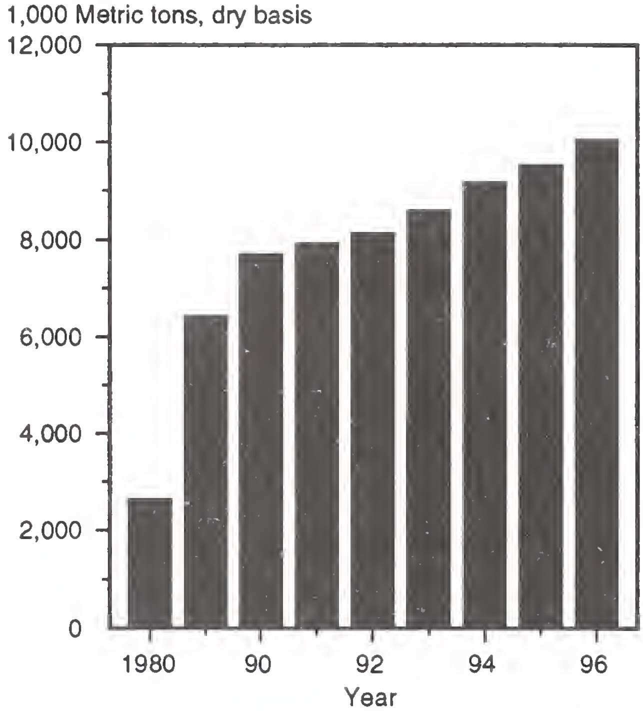


Figure 21

World HFCS Production



Source: LMC International and USDA.

Table 1--World Sugar Supply, Use, and Prices 1/

	1991/ 1992	1992/ 1993	1993/ 1994	1994/ 1995	1995/ 1996	1996/ 1997 2/
	Million metric tons, raw value					
Supply						
Beginning stocks	20.93	23.51	21.57	18.61	20.83	24.74
Production	116.51	112.09	109.79	115.84	122.51	125.14
Imports	30.80	28.98	29.86	30.53	35.07	35.46
Use						
Exports	30.80	28.98	29.86	30.53	35.07	35.46
Domestic consumption	113.93	114.03	112.75	113.62	118.61	123.07
Ending stocks	23.51	21.57	18.61	20.83	24.74	26.80
Stocks/Consumption (%)	20.64	18.92	16.51	18.34	20.86	21.77
World raw sugar price 3/	9.23	9.56	10.99	13.85	12.48	10.11

1/ Marketing varies by country. 2/ Forecast includes WASDE update for the U.S., February 12, 1997. 3/ Contract No. 11, f.o.b. stowed Caribbean, Sept.-Aug. average. 1995/1996 Sept.-Nov. average.

Source: USDA.

Table 2--World Sugar Production and Consumption Balance, by Region

Region/Country	Production Average 1984/85-1986/87	Production Average 1994/95-1996/97	Consumption Average 1984/85-1986/87	Consumption Average 1994/95-1996/97	Surplus/Deficit Average 1984/85-1986/87	Surplus/Deficit Average 1994/95-1996/97
	Million metric tons, raw value					
Asia	23.0	39.1	27.7	40.4	-4.7	-1.3
China	5.3	6.6	6.6	8.3	-1.3	-1.7
India	8.2	17.2	9.4	15.1	-1.2	2.1
Thailand	2.9	6.1	0.8	1.6	2.1	4.5
Oceania	3.9	5.8	1.0	1.1	2.9	4.7
Latin America	28.4	32.3	17.0	20.9	11.4	11.4
Brazil	8.7	13.6	6.4	8.2	2.3	5.4
Cuba	7.5	4.1	0.8	0.6	6.7	3.5
Mexico	3.8	4.6	3.5	4.3	0.3	0.3
North Africa/ Middle East	4.0	4.9	9.2	11.1	-5.2	-6.2
Sub-Saharan Africa	5.9	5.6	4.6	4.2	1.3	0.4
EU-15	15.5	16.9	12.7	14.0	2.8	2.9
Former Soviet Union (FSU)	8.5	5.8	13.7	9.6	-5.2	-3.8
Central Europe	5.7	3.5	5.9	4.0	-0.2	-0.5
United States	5.7	6.8	7.2	8.7	-1.5	-1.9
Other	0.3	0.5	1.8	3.4	-1.5	-2.9
World Total	100.9	121.2	100.8	118.4	0.1	2.8

Source: USDA.

Table 3--Percent Distribution of World Sugar Production and Consumption, by Region

	Average Production		Average Consumption	
	1984/85-1986/87	1994/95-1996/97	1984/85-1986/87	1994/95-1996/97
	Million metric tons, raw value			
Asia	22.8	32.3	27.5	34.1
China	5.3	5.4	6.5	7.0
India	8.1	14.2	9.3	12.8
Thailand	2.9	5.0	0.8	1.4
Oceania	3.9	4.8	1.0	0.9
Latin America	28.1	26.7	16.9	17.7
Brazil	8.6	11.2	6.3	6.9
Cuba	7.4	3.4	0.8	0.5
Mexico	3.8	3.8	3.5	3.6
North Africa/Middle East	4.0	4.0	9.1	9.4
Sub-Sahara Africa	5.8	4.6	4.6	4.4
EU-15	15.4	13.9	12.6	11.8
Former Soviet Union (FSU)	8.4	4.8	13.6	8.1
Central Europe	5.6	2.9	5.9	3.4
United States	5.6	5.6	7.1	7.3
Other	0.3	0.4	1.8	2.9
World Total	100.0	100.0	100.0	100.0

Source: USDA.

Table 4--U.S. Sugar Relative to Leading Countries, 1996/97

Production		Consumption		Imports	
Million metric tons, raw value					
EU	17.24	India	16.00	Russia	3.20
India	17.00	EU	14.06	China	2.50
Brazil	14.50	U.S.	8.89	U.S.	2.48
China	7.00	China	8.60	EU	2.19
U.S.	6.61	Brazil	8.40	Japan	1.64
World	125.14	World	123.07	World	35.46

Source: USDA.

Table 5--World production of HFCS for selected countries

Year	United States	Canada	Mexico	Argentina	EU	Japan	South Korea	Taiwan	Others	World total
				1,000 metric tons, dry basis						
1985	4,775	210	0	156	287	680	144	NA	168	6,420
1986	4,841	234	0	159	267	682	153	15	119	6,470
1987	5,145	202	0	169	265	724	182	15	78	6,780
1988	5,381	222	0	164	271	710	219	19	104	7,090
1989	5,370	239	0	146	276	744	244	51	130	7,200
1990	5,677	245	0	156	280	784	270	67	211	7,690
1991	5,852	252	0	175	284	778	276	110	193	7,920
1992	6,041	250	0	180	286	761	263	125	224	8,130
1993	6,459	255	0	190	288	745	282	150	221	8,590
1994	6,814	255	0	210	290	742	285	170	394	9,160
1995	7,171	255	0	220	303	730	250	180	401	9,510
1996	7,425	255	80	195	305	709	260	195	606	10,030

NA=Not available.

Sources: Economic Research Service, USDA for the United States. USDA Agricultural Attache reporting and LMC International for other countries.

Table 6--Location of Sugarbeet Production

	Average 1984/85-1986/87	Average 1994/95-1996/97	Average 1984/85-1986/87	Average 1994/95-1996/97
	1,000 Short tons, raw value		Percent of total	
California	4,863	3,186	21	11
Idaho	3,640	4,960	16	17
Minnesota	4,874	7,957	21	28
North Dakota	2,555	4,138	11	14
Great Plains	4,470	4,844	19	17
Michigan	2,243	2,654	10	9
Others 2/	630	1,089	3	4
Total U.S.	23,275	28,829	100	100

1/ Colorado, Montana, Nebraska, Texas, and Wyoming.

2/ New Mexico, Ohio, Oregon, Washington, Kansas, and Nevada.

Source: USDA.

Table 7--Location of Sugarcane Production

	Average 1984/85-1986/87	Average 1994/95-1996/97	Average 1984/85-1986/87	Average 1994/95-1996/97
	1,000 Short tons, raw value		Percent of total	
Florida	12,539	15,066	46	50
Hawaii	8,250	4,263	30	14
Louisiana	5,570	9,834	21	32
Texas	915	1,213	3	4
Total	27,274	30,376	100	100

1/ Sugarcane for sugar and seed, in net tons.

Source: USDA.

Table 8--U.S. Sugar Beet Processing (Slicing) Capacity

	1982	1997
Number of Companies	11	9 1/
Number of Factories	42	30
Average Factory Slicing Capacity (Short tons/day)	4,074	6,054
Total U.S. (Short tons/day) 1/	171,100	181,610

1/ Excludes Great Lakes Sugar Co., which has suspended operations.

Source: USDA.

Table 9--U.S. Sugarcane Processing Capacity

	1982	1997
Number of Companies		
Florida	6	6
Hawaii	12	5
Louisiana	24	19
Texas	1	1
U.S.	43	31
Number of Factories		
Florida	7	7
Hawaii	14	6
Louisiana	24	20
Texas	1	1
U.S.	46	34
Average Grinding Capacity (Short tons/day)		
Florida	13,971	17,000
Hawaii	4,329	4,383
Louisiana	4,956	7,250
Texas	9,500	10,000
U.S.	6,236	8,832
Total Capacity (Short tons/day)		
Florida	97,800	119,000
Hawaii	60,600	26,300
Louisiana	118,950	145,000
Texas	9,500	10,000
U.S.	286,850	300,300

Source: USDA.

Table 10--U.S. Cane Sugar Refining Capacity

	1982	1997
Number of Companies	14	6
Number of Factories	21	11
Average Melting Capacity (Short tons/day)	1,465	2,054
Total Capacity (Short tons/day)	30,760	22,590
Plus:		
Spreckels (Beet Processor With Cane Ref. Cap.)	---	410
Snow White (Puerto Rico)	---	885

Source: USDA.

Table 11--Net Production and Processing Costs

	Average 1982-1984	Average 1992-1995
	Cents a pound	
Raw Cane Sugar		
Florida	19.8	19.8
Hawaii	23.8	26.2
Louisiana	21.4	19.9
Texas	27.2	19.9
Refined Beet Sugar		
Eastern 1/	21.8	20.1
Western 2/	24.4	23.5

1/ Largely Non-irrigated. Includes Michigan, Ohio, Minnesota, and Eastern North Dakota. 2/ Irrigated. Includes Colorado, Nebraska, Wyoming, Texas, Montana, Western North Dakota, Idaho, Oregon, and California.

Table 12--U.S. sugar (including Puerto Rico) supply and use, fiscal year 1/

Items	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97		
							Sept.	Jan.	Feb.
					1,000 short tons, raw value				
Beginning stocks 2/	1,224	1,524	1,477	1,704	1,337	1,241	1,391	1,492	1,492
Total production 3/ 4/	6,978	7,306	7,838	7,655	7,927	7,370	7,050	7,290	7,290
Beet sugar	3,854	3,845	4,392	4,090	4,493	3,916	3,900	4,000	4,000
Cane sugar	3,124	3,461	3,446	3,565	3,434	3,454	3,150	3,290	3,290
Florida	1,802	1,832	1,710	1,771	1,725	1,771	1,760	1,760	1,760
Louisiana	480	763	876	893	1,019	1,057	870	1,045	1,045
Texas	88	109	138	146	144	134	100	85	85
Hawaii	722	689	658	705	499	458	390	370	370
Puerto Rico	74	68	65	50	46	34	30	30	30
Total imports	2,825	2,194	2,039	1,772	1,853	2,772	3,021	2,955	2,734
Tariff-rate Quota imports 5/	2,298	1,486	1,335	1,113	1,564	2,231	2,560	2,490	2,269
Oct.-Dec.	407	162	171	193	242	211	NA	360	300
Jan.-Sept.	1,891	1,324	1,164	920	1,322	2,020	NA	2,130	1,969
Canada and high duty imports	32	39	40	56	50	1	1	5	5
Quota-exempt imports for reexport	599	667	601	641	230	530	450	450	450
Quota-exempt imports for polyhydric alcohol	8	10	10	16	10	10	10	10	10
Statistical adjustments 3/	-112	-8	53	-53	-1	0	0	0	0
Total Supply	11,027	11,024	11,354	11,131	11,117	11,383	11,462	11,737	11,516
Total exports 3/	627	554	405	454	502	385	200	250	250
Quota-exempt for reexport	706	562	397	432	444	377	200	250	250
Other exports	0	0	10	30	58	8	0	0	0
CCC disposal, for export	0	0	0	0	0	0	0	0	0
Statistical difference 6/	-79	-8	-2	-8	0	0	0	0	0
Miscellaneous	-25	-13	48	7	37	-48	0	0	0
CCC disposal, for domestic non-food use	0	0	0	0	0	0	0	0	0
Refining loss adjustment	61	0	0	0	0	0	0	0	0
Statistical adjustment 7/	-86	-13	48	7	37	-48	0	0	0
Total deliveries	8,901	9,006	9,197	9,333	9,337	9,554	9,825	9,900	9,800
Transfer to sugar-cont. products for exports under reexport program	59	88	148	143	88	100	120	120	120
Transfer to polyhydric alcohol	8	11	15	15	10	13	10	10	10
Deliveries for domestic food and beverage use	8,834	8,907	9,034	9,175	9,239	9,441	9,695	9,770	9,670
Total Use	9,503	9,547	9,650	9,794	9,876	9,891	10,025	10,150	10,050
Ending stocks 3/	1,524	1,477	1,704	1,337	1,241	1,492	1,437	1,587	1,466
Privately owned	1,524	1,477	1,704	1,331	1,241	1,492	1,437	1,587	1,466
CCC	0	0	0	6	0	0	0	0	0
					Percent				
Stocks-to-use ratio	16.04	15.47	17.66	13.65	12.57	15.08	14.33	15.64	14.59
					Millions				
Population, including Puerto Rico, (April 1) 8/	255.68	258.53	261.39	263.80	266.34	268.72	271.12	271.12	271.12
					Pounds				
Per capita total deliveries, refined basis 9/	64.6	64.4	65.8	66.1	65.5	66.5	67.7	68.3	67.6

1/ Fiscal year beginning October 1. 2/ Stocks in hands of primary distributors and CCC. 3/ Historical data are from FSA (formerly ASCS), Sweetener Market Data, and NASS, Sugar Market Statistics prior to 1992.
4/ Production in 1996/97 is from Interagency Sugar Estimates Committee. 5/ Actual arrivals under the tariff rate quota (TRQ) with late entries and TRQ overfills assigned to the fiscal year in which they actually arrived. The 1996/97 TRQ assumes announced allocations will be added in January, March and May 1997. 6/ Receipts compiled by NASS and FSA deiffer from U.S. Customs data. 7/ Calculated as a residual. Largely consists of invisible stocks change.
8/ Population data obtained from the U.S. Census Bureau with data estimates developed by Economic Research Service. Population data include Puerto Rico. 9/ Includes all sugar deliveries. Refined basis is raw value divided by 1.07.

Table 13--U.S. (including Puerto Rico) Total Consumption of Caloric Sweeteners, Calendar Year 1/

Year	Sugar 2/		Corn sweeteners						Total
	Raw value	Refined basis	HFCS	Glucose syrup	Dextrose	Total	Pure honey	Edible syrups	Total caloric sweeteners 3/
	1,000 short tons, dry basis								
1985	8,176	7,641	5,386	1,919	418	7,723	128	50	15,543
1986	7,932	7,413	5,498	1,952	430	7,880	141	50	15,485
1987	8,311	7,767	5,792	1,988	441	8,221	160	50	16,199
1988	8,315	7,771	5,999	2,037	452	8,488	139	50	16,448
1989	8,431	7,879	5,961	2,100	464	8,525	146	50	16,600
1990	8,789	8,214	6,235	2,210	479	8,924	152	50	17,340
1991	8,835	8,257	6,408	2,332	489	9,229	152	50	17,688
1992	8,936	8,351	6,683	2,462	492	9,637	149	50	18,188
1993	9,064	8,471	7,129	2,566	500	10,195	152	50	18,868
1994	9,321	8,711	7,456	2,645	513	10,614	146	50	19,521
1995	9,451	8,833	7,796	2,704	528	11,028	146	50	20,057
1996 4/	9,643	9,012	8,057	2,750	538	11,345	146	50	20,553

1/ Totals may not add due to rounding. 2/ Based on total sugar deliveries, including for use in products for export. 3/ Total includes sugar, refined basis. 4/ Estimate.

Source: Economic Research Service, USDA.

Tab 14--U.S. Sugar Long-Term Projections

Item	FY 1995	FY 1996	FY 1997 1/	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003
	1,000 Short tons, raw value								
Production	7,927	7,370	7,290	7,480	7,460	7,530	7,640	7,750	7,870
Beet Sugar	4,493	3,916	4,000	4,230	4,290	4,360	4,420	4,490	4,550
Cane Sugar	3,434	3,454	3,290	3,250	3,170	3,170	3,220	3,260	3,320
Consumption (Deliveries)	9,337	9,553	9,800	9,930	10,060	10,190	10,320	10,450	10,590
Quota Imports 2/	1,614	2,235	2,269	2,374	2,500	2,560	2,580	2,600	2,620

1/ Reflects change in February 1997 WASDE.
2/ Includes very small amounts of high-duty imports.

Source: USDA, Agricultural Baseline Projections to 2005, Reflecting the 1996 Farm Act, issued February 1997.

Table 14--U.S. Sugar: Long-Term Projections, Fiscal Years 1/

Item	Units	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
UNITED STATES BASELINE														
Beets-Planted	1000 Acres	1,437	1,438	1,476	1,445	1,424	1,425	1,440	1,455	1,470	1,485	1,500	1,515	1,530
Harvested	1000 Acres	1,412	1,409	1,443	1,417	1,324	1,400	1,415	1,430	1,445	1,460	1,475	1,490	1,505
Yield	Tons/Acre	20.6	18.6	22.1	19.8	20.2	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3
Production	Mil. S. Tons	29.1	26.2	31.9	28.0	26.8	28.4	28.7	29.0	29.3	29.6	29.9	30.2	30.6
Cane-Harvested	1000 Acres	909	927	889	893	841	874	849	849	859	868	878	888	888
Yield	Tons/Acre	32.7	32.7	32.5	32.8	31.7	31.4	31.3	31.2	31.2	31.2	31.1	31.1	31.2
Production	Mil. S. Tons	29.7	30.0	28.9	29.3	26.6	27.4	26.6	26.5	26.8	27.1	27.3	27.6	27.7
Supply:														
Beginning Stocks	1000 S. Tons	1,477	1,704	1,337	1,241	1,495	1,496	1,540	1,560	1,580	1,600	1,620	1,640	1,660
Production	1000 S. Tons	7,838	7,655	7,927	7,370	7,130	7,480	7,460	7,530	7,640	7,750	7,870	7,970	8,040
Beet Sugar 2/	1000 S. Tons	4,392	4,090	4,493	3,916	3,950	4,230	4,290	4,360	4,420	4,490	4,550	4,610	4,670
Cane Sugar 3/	1000 S. Tons	3,446	3,565	3,434	3,454	3,180	3,250	3,170	3,170	3,220	3,260	3,320	3,360	3,370
Total imports	1000 S. Tons	2,039	1,772	1,853	2,775	3,021	2,824	2,950	3,010	3,030	3,050	3,070	3,110	3,180
For consumption 4/	1000 S. Tons	1,375	1,169	1,614	2,235	2,561	2,374	2,500	2,560	2,580	2,600	2,620	2,660	2,730
Other imports 5/	1000 S. Tons	664	656	239	540	460	450	450	450	450	450	450	450	450
Total supply	1000 S. Tons	11,354	11,131	11,117	11,386	11,646	11,800	11,950	12,100	12,250	12,400	12,560	12,720	12,880
Use:														
Domestic disappearance	1000 S. Tons	9,197	9,333	9,337	9,553	9,900	9,930	10,060	10,190	10,320	10,450	10,590	10,730	10,870
Exports	1000 S. Tons	405	454	502	385	250	330	330	330	330	330	330	330	330
Miscellaneous 6/	1000 S. Tons	48	7	37	-47	0	0	0	0	0	0	0	0	0
Total use	1000 S. Tons	9,650	9,794	9,876	9,891	10,150	10,260	10,390	10,520	10,650	10,780	10,920	11,060	11,200
Ending stocks	1000 S. Tons	1,704	1,337	1,241	1,495	1,496	1,540	1,560	1,580	1,600	1,620	1,640	1,660	1,680
Stocks/use ratio	Percent	17.7	13.7	12.6	15.1	14.7	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Raw sugar prices:														
World (No. 11)	Cents/lb.	9.58	11.25	13.86	12.40	10.50	11.10	11.70	11.80	12.10	12.50	12.80	13.20	13.50
N. Y.(No. 14) 7/	Cents/lb.	21.49	22.05	22.76	22.50	22.10	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00
Raw sugar loan rate	Cents/lb.	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00
Beet sugar loan rate	Cents/lb.	23.33	23.62	23.43	22.90	22.90	22.90	22.90	22.90	22.90	22.90	22.90	22.90	22.90
Grower prices: 8/														
Sugarbeets	Dol./ton	41.40	39.00	38.80	39.80	41.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00
Sugarcane	Dol./ton	28.10	28.50	29.20	29.40	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00

NA = Not applicable

1/ Fiscal year is October 1 through September 30. The 1995 crop corresponds with fiscal 1996, etc. Historic data for area planted, harvested, yield, production, and prices of sugarbeets and sugarcane are on the NASS crop year basis; all other data are on a fiscal year basis. 2/ Beet sugar yield, raw value, per ton of beets (not including sugar from molasses) rises on trend, at 0.04 percentage points each year. Desugaring of molasses adds a net 275,000 tons in 1996, 260,000 tons in 1997, 290,000 tons in 1998, and then rises about 10,000 tons a year. 3/ Raw cane sugar yield per ton of cane rises 0.4 percent per year as new processing technology is adopted. 4/ Quota imports, both raw and refined, at the low rate of duty and very small amounts of high-duty imports. Projected imports do not necessarily reflect the determination by the Secretary which will be made pursuant to Additional U.S. Note 3 of Chap. 17 of the HTSUS. 5/ For re-export & for polyhydric alcohol. 6/ Includes CCC disposals, refining loss, and a statistical adjustment to account for invisible stock change.

7/ Through 1996, fiscal year average of the nearest futures, No. 14 contract, New York Coffee Sugar & Cocoa Exchange, for 1997 forwards, projected.

8/ For 1997 forwards, projected

THE CHOICES FACING THE EUROPEAN COMMUNITY IN THE LIGHT OF THE PROGRESS TOWARDS MORE OPEN MARKETS

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At the Singapore W.T.O. meeting last December, Trade Ministers agreed that before negotiations begin at the end of 1999 on the next steps of agricultural trade reform, the W.T.O. Agriculture Committee should complete an important work programme. This programme is to analyse the application of the existing agreement to help all participants to define their negotiating positions for the next stage of the agreement. Meantime, the OECD is also starting a work programme designed to analyse the effects of member countries agricultural policy measures.

I don't know how either body will go about their task. I hope, however, that both bodies will not limit themselves to checking compliance with the existing rules - although compliance is certainly a key part of the W.T.O. Agriculture Committee mandate - and that they will also help us all to learn lessons from the effects of the policies which have been applied to ensure compliance with the current Agreement.

I hope that this work will genuinely serve the purpose assigned to it by W.T.O. Ministers - to help W.T.O. members to prepare their negotiating positions. This implies that detailed negotiating positions should not be defined in advance of this process. Indeed, if all participants decide in advance what they must obtain from the next negotiation before they have analysed the consequences of the last one, then the risk that no one will succeed in their objectives must be great. This is the backdrop of the topic I am addressing today - the options facing the Community in a more open trading environment - covers the experience we are gaining of the current trading environment, which is certainly more open then that which existed in the past. It also invites me to speculate about the options we will face after the next stage of the W.T.O. process.

What I intend to do is to explore the history behind, and experience of, our current policies and try to derive from this some key conclusions for the future.

In 1992, the Community adopted an agricultural reform which was generally regarded as representing the biggest co-ordinated change of policy since the Common Agricultural Policy was introduced in the 1960s. In 1994 the Uruguay Round was completed and included for the first time a comprehensive Agreement on Agriculture. This dealt not only with trade mechanisms but also with domestic agricultural policies.

These two events were, of course, connected. The policy debates within the Community which eventually led to the 1992 reform began when Community policy makers were deciding on their position for the final stage of the Uruguay Round, which was due to end in December 1990. And the

outcome of the 1992 reform was a policy for the Community which could form one of the elements of a package GATT decision on domestic policies. Furthermore it provided a mechanism which, on the basis of the best forecasts, would enable the Community to fulfil its commitment to limit subsidised exports of cereals.

It would, however, be wrong to think that the only, or even the primary, motivation for Community Agriculture Ministers to adopt the 1992 reform was the prospect of an early GATT agreement. Indeed, at the time it was adopted the GATT negotiation appeared to be going nowhere, after the set back of 1990. The vital motor for the 1992 reform was disillusionment with the policies which the Community had been following up to that point, particularly its policy in the cereals sector.

That policy had its roots in a Budget crisis which had occurred five years earlier. In 1987 the Community's agricultural policy and, at the heart of that policy, its cereal policy, was in deep trouble. The attempts the Commission had made at the end of the 1960s to curb cereal support prices had collapsed in the market euphoria of the early 1970s, when the Club of Rome was forecasting imminent shortages of all basic commodities and when world markets rose to dizzy heights which seemed to confirm that analysis. The efforts at the early 1980's to reduce prices and to limit the growth in the Agricultural budget had failed. As a consequence, the cost of the policy exceeded the financial resources the Community was committed to provide.

A central part of the deal struck in 1988 to increase these resources was a comprehensive programme of measures to curb output of the major CAP commodities. For cereals, this involved a combination of producer levies and automatic and cumulative price cuts of 3% per year triggered each time an output limit of 160 m tonnes was exceeded.

Given the political sensitivity of price cuts, a voluntary set aside policy was introduced, which some saw as a means of avoiding the need for price cuts and others as a means of making price cuts more effective.

As early as 1990 this policy came under severe criticism. Sure price cuts had been made. Sure this had helped to cut expenditure - with support prices far above world prices every three percent reduction in intervention prices reduced refund expenditure by nearly double that percentage. But not much land seemed to have gone into set aside, and what land had gone in seemed to have come from somewhere else, because the cereals area didn't seem to be going down.

Worse, production didn't seem to be going down, as politicians thought economists had said it would do. Serious, and otherwise perfectly normal and rational, people began to say that when you reduce prices, farmers produce more in order to try to maintain their incomes. I don't myself believe this. I've never met a serious economist who believes in backward sloping supply curves, with output inversely linked to price. But I do believe, and the Community's experience at the end of the 1980's confirms this, that if you try to control production of all major products by cutting support prices in some sectors and imposing quotas in others, the main impact of the price cuts is not on production. Relative price changes are quite effective as a means of moving production from one sector to another. But pressure on all major commodities tends to have its main impact first on incomes and then on the so called fixed costs.

In other words, first all farmers become poorer and more discontented. Then labour inputs are reduced and land costs (be they land prices, rents or taxes on land) start to fall. Economists might see all this as a desirable improvement in efficiency and competitiveness. But farmers, who risk loosing both income and - if they own their land - wealth, can't be expected to enjoy it. More generally, when the process starts to accelerate excessively the process of structural change - or to put this economic jargon into concrete terms, when ever increasing numbers of farmers leave agriculture or become part time - the population generally became uneasy. Even largely urban countries with only a tiny share of their active work force engaged in agriculture see in their rural areas the essence of their national identities. When change in the countryside become unbearably fast, the whole nation feels uneasy.

The 1992 reform sought to cure the key defects of the 1988 policy. Cereals prices were cut much more drastically - by around 30% over three years - but farmers were compensated with aids largely decoupled from current production. So the beneficial effect on consumption, and - to the extent that this happens at all - on supply, of price cuts would be achieved without damage to incomes, employment and land values. At the same time the ineffective voluntary set aside scheme was replaced by set aside as a condition of receiving compensation for price cuts. So almost all farmers (except very small ones, who were exempted) would participate in set aside, thereby making a bigger contribution to output reduction than they would simply as a result of the price signals. This programme was elegant politically as well as economically. Community Agriculture Ministers tend to belong to one of two apparently irreconcilable schools of thought. One school holds that the best course for Community Agriculture is to make - over time and at a bearable pace - the structural adaptations necessary to enable it to compete aggressively on world markets. The other that Community Agriculture should retain its distinctive "traditional" character, relying on prices which are adequate to sustain its traditional cost structure, sustained by import protection and output restrictions.

The 1992 reform offered something to both points of view. But both had to accept compromise.

Both sides, therefore, wanted certain reassurances. Those whose instincts lay in expansion and competitiveness wanted to be reassured that the Community's efforts to contain production would be matched by that of other trading partners. If you in the U.S. noticed this, you no doubt find this to be somewhat presumptuous, as you had been operating a compulsory set aside scheme for decades!

Those whose instincts were with traditional agriculture wanted reassurance that the compensatory aids would be permanent and would not be phased out.

Both agreed that production restraints pre supposed adequate protection against imports.

The first few years experience of the new policy surpassed the most optimistic expectations. Production fell. Consumption increased. Stocks were reduced from over 30m tonnes to near zero. Market prices initially followed support prices down but then stopped falling when a balanced market made support unnecessary. Naturally, therefore, incomes rose. And with world prices rising too, a good part of the cost of the compensatory aids was offset by the reduction and finally elimination of export refunds. The first year's experience of W.T.O. export limits in the Cereals sector was totally

painless. Only about 10% of our GATT limit on subsidised exports of wheat and wheat flower was exported with refunds: Only 30% of coarse our grain limit was exported with refunds.

On top of all this, over the period of the application of the 1992 reform it has been possible to reduce gradually the rate of obligatory set aside from its initial rate of 15% to 12½ then to 10% . Finally, at the time of maximum euphoria over the need to supply ever tighter world markets, it was decided that the rate for 1996/97 - that is the rate which will affect the 1997 harvest - should be 5%.

All almost to good to be true. And certainly not all due to the change of policy. The initial reduction in cereal production was certainly largely due to set aside. But more recently the greatest influence has been adverse weather conditions, particularly in the South of the Community. Fertiliser use certainly fell, but the change can largely be attributed to set aside. We don't yet have conclusive evidence that the cut in prices on its own has led to less intensive production and less output.

Some researchers would say that this was due to the fact that the change in the balance of the market meant that prices didn't fall as far as was intended. Others would say that far bigger price cuts would be needed before it paid producers to use less fertiliser than the technical optimum.

However, this may be, the 1996 crop looks to have been over 200m tonnes, a very sharp increase from the figure of about 175m of the previous year. This extra production is partly due to the relatively low level of obligatory set aside. But the main reason for the increase in production is a surge in yields. This extra production is available at the same time as production elsewhere in the world has also been recovering and at the same time as the Community's Agricultural budget has been put under new strain, in particular because of the effects on the beef market of B.S.E.

So, although export refunds have been re-introduced to enable Community exporters to follow the downward movement of world prices, we have neither the budgetary resources nor the intention of provoking a price war. In these circumstances it will be difficult to increase export volumes So a significant rebuilding of intervention stocks by the end of the current season seems inevitable.

This then is the economic background against which Community Agriculture Ministers should begin this year to reflect the agricultural policy for the next decade. The Commission has yet to present precise proposals. But it has given broad indications. In an "Alternative Strategies" paper presented to Community Heads of Government in 1996 it said that, whilst existing policies were adequate for the moment, they would not serve as a basis for enlargement of the Community to encompass the Eastern Europe countries - which, in total will increase the Community's arable are by 55% and its population by only 29% - nor to meet the challenge of the next stage of the W.T.O. To meet these challenges the Commission has suggested that prices should be further reduced with compensation; but not necessarily with compensation calculated in the same way as in 1992. More recently, a major conference in Cork reached broad consensus on the need for an integrated rural policy which recognised that the rural economy could no longer be sustained simply through agricultural support.

Some in the Community are suggesting even more radical changes. David Naish, the President of the Community Farmers Association - (but I have to add, speaking in his capacity as President of the

English farmers) has been arguing strongly for a liberalised policy with less support and the end of production restrictions in Europe, just as you have ended them over here.

But arguments within the Community is not all in the same direction. I spoke earlier of the long standing division between the relatively liberal expansionist Ministers and those Ministers who believe that the key objective is to maintain traditional farm structures supported by remunerative prices, production restraint and import protection. This second school of thought has powerful arguments to make too. To compete on world markets without refunds would require, in several sectors and in particular milk, drastic price reductions. Such reductions, they argue, would be catastrophic for the existing generation of farmers and for the existing structure of Community Agriculture unless it was accompanied by massive compensatory payments. The Farm Budget will be hitting its limits in 1997 and again in 1998, even on existing policies. Governments are not going to find the budgetary resources to increase these limits when they are all struggling to meet the strict budgetary conditions for participation in Monetary Union. So drastic policy change, they argue, is out of the question for the foreseeable future.

I cannot today predict what concrete proposals the Commission will advance to try to reconcile these very different views. Indeed, I think that the process of debate will have to advance some way before any proposal could sensibly be made. Instead, what I should like to do is to draw some broad conclusions from the lessons of our recent history.

First, I am convinced that even large price cuts across the board would not lead to major reductions in Community output. Sure they would change the structure of Community agriculture but they would not drive us off world markets.

Second, provided compensatory aids are decoupled from current output, as is already very largely the case with the arable compensatory aid introduced in 1992, the main impact of such aids is to protect farm incomes, farm structure and land values not to sustain output.

Third - as a consequence of the first two conclusions - the presence or absence of direct output control measures is more important then <u>overall</u> price policy in determining output.

Fourth, as was recognised in the preliminary papers which led to the 1992 reform, production control devices only make sense if there is an adequate level of import protection and they are difficult to defend unless other major players also have protection controls.

This brings me to my major conclusion. In an open trading environment, Community producers have, in reality no choice but to be present on world markets. Paradoxical though it may seem, the only circumstance in which there would be a possible option for the Community to withdraw from world markets would be if the process of trade liberalisation went into reverse. In that situation - and only in that situation - the Community could, if it chose, pursue a high price/low output programme, behind strong import barriers.

EXPORT CHALLENGES FOR RED MEAT INDUSTRY AS WE ENTER THE NEW MILLENIUM

Phillip M. Seng
President and CEO
U.S. Meat Export Federation

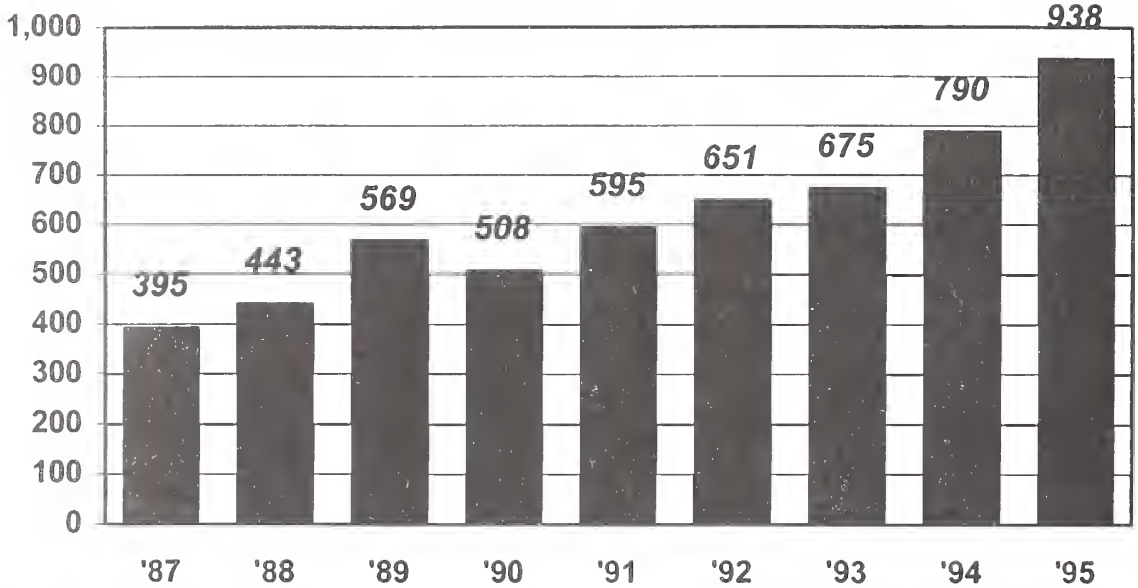
USMEF International Office Network

- 1976 Denver
- 1977 Tokyo
- 1980 Hamburg
- 1980 Middle East
- 1984 Singapore
- 1988 Hong Kong
- 1989 Taipei
- 1990 Mexico City
- 1991 Seoul
- 1992 Osaka
- 1993 Caribbean
- 1993 Russia & FSU
- 1994 Western Hemisphere
- 1995 China

USMEF Sectors

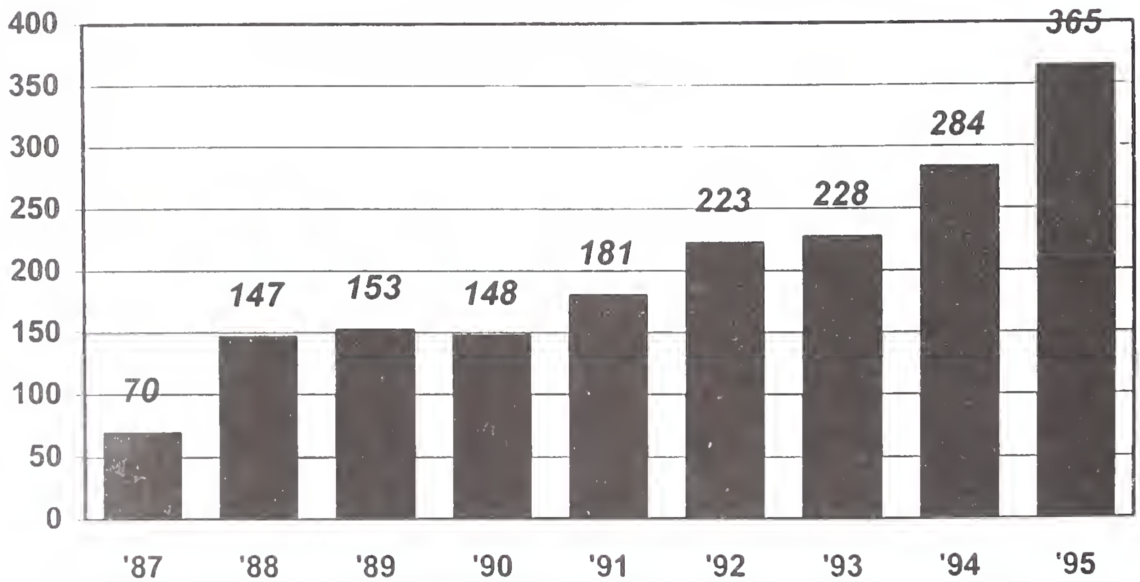
1. Beef Producing and Feeding
2. Pork Producing and Feeding
3. Lamb Producing and Feeding
4. Grains and Soybean Producing
5. Packing and Processing
6. Purveying and Trading
7. Farm Organizations
8. Agribusiness

U.S. Beef & Beef Variety Meats Exports
(Thousand Metric Tons)



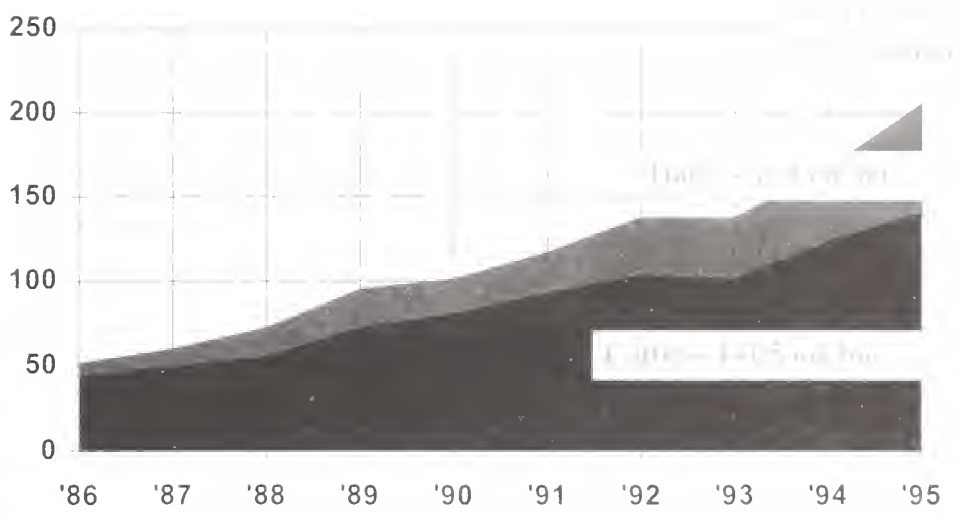
Source: USDA

U.S. Pork & Pork Variety Meats Exports
(Thousand Metric Tons)

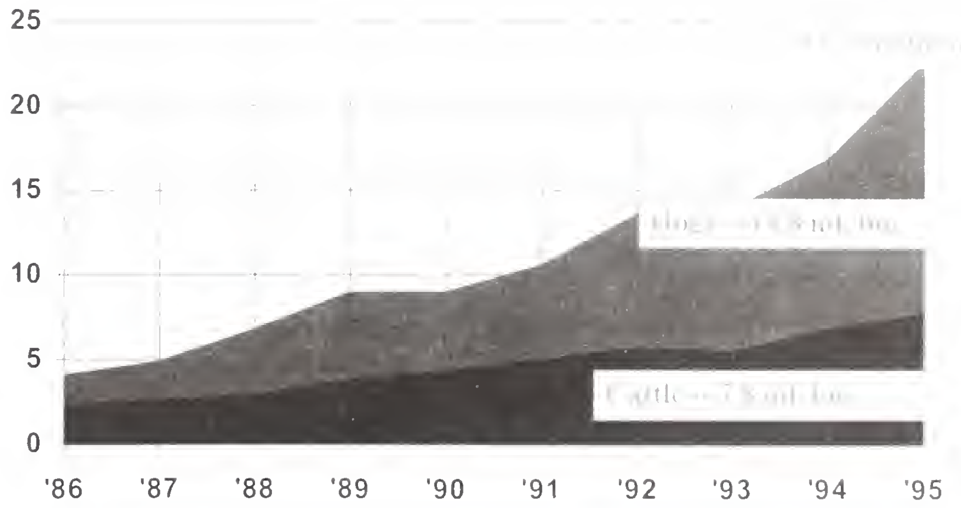


Source: USDA

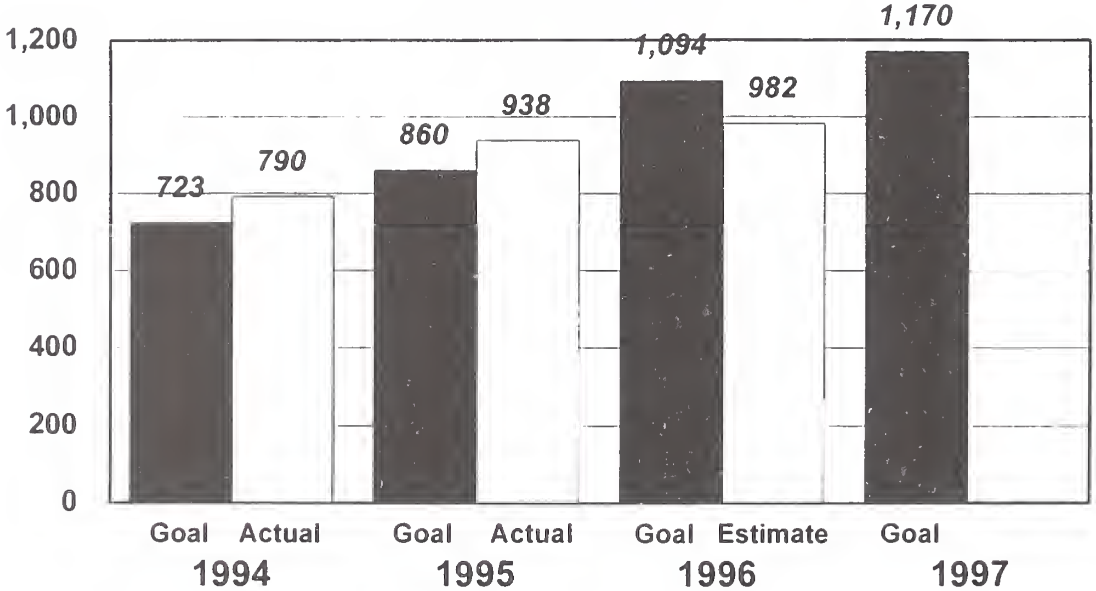
U.S. Feedgrain Exported Through U.S. Beef and Pork Exports
(Million Bushels)



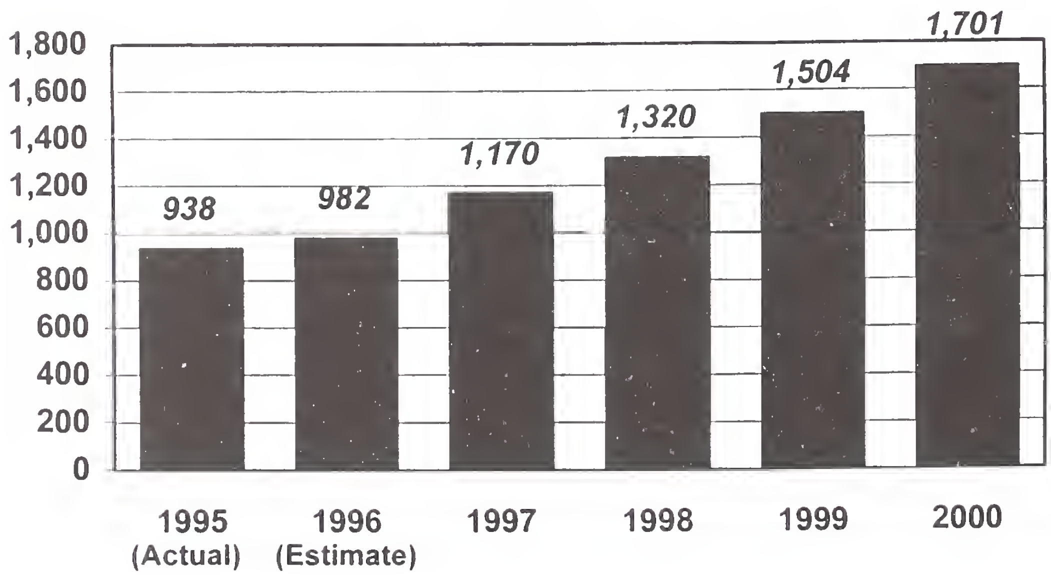
U.S. Soybeans Exported Through U.S. Beef and Pork Exports
(Million Bushels)



U.S. Beef & Beef Variety Meats
Annual Goals vs. Actual Exports
(Thousand Metric Tons)



USMEF Export Goals
Beef & Beef Variety Meats
(Thousand Metric Tons)



USMEF Export Goals
Beef & Beef Variety Meats
(Thousand Metric Tons)

Country	*'96*	*'97*	*'98*	*'99*	*'00*	*Increase '96 - '00*
Japan	545	616	678	734	791	45%
Canada	108	115	120	122	125	16%
Mexico	84	100	126	167	200	138%
Korea	80	100	120	150	190	138%
Russia	50	67	80	100	130	160%
Others	115	172	196	231	265	130%
TOTAL	982	1,170	1,320	1,504	1,701	73%

JAPAN
Beef & Beef Variety Meats

1996	*1997*	*Annual Increase*
545,000 mt	*616,000 mt*	*13%*

- ➔ No Adverse Food Safety Issues Arise
- ➔ U.S. Price Remains Stable
- ➔ Yen Remains Stable
- ➔ New Markets Within a Market Are Identified

CANADA

Beef & Beef Variety Meats

1996	1997	Annual Increase
108,000 mt	115,000 mt	6%

➔ Favorable Exchange Rates

➔ Competitive Geographic Advantages

➔ NAFTA Utilization

MEXICO

Beef & Beef Variety Meats

1996	1997	Annual Increase
84,000 mt	100,000 mt	19%

➔ Peso Stability

➔ U.S. Price Remains Stable

➔ Economic Growth to Strengthen Middle Class

➔ NAFTA Utilization

➔ International Competition Does Not Increase

KOREA

Beef & Beef Variety Meats

1996	1997	Annual Increase
80,000 mt	100,000 mt	25%

- ➔ No Adverse Food Safety Issues Arise
- ➔ SBS System Awards Quota to Sectors With Most Potential
- ➔ U.S. Introduces New Cuts
- ➔ U.S. Price Remains Stable

RUSSIA

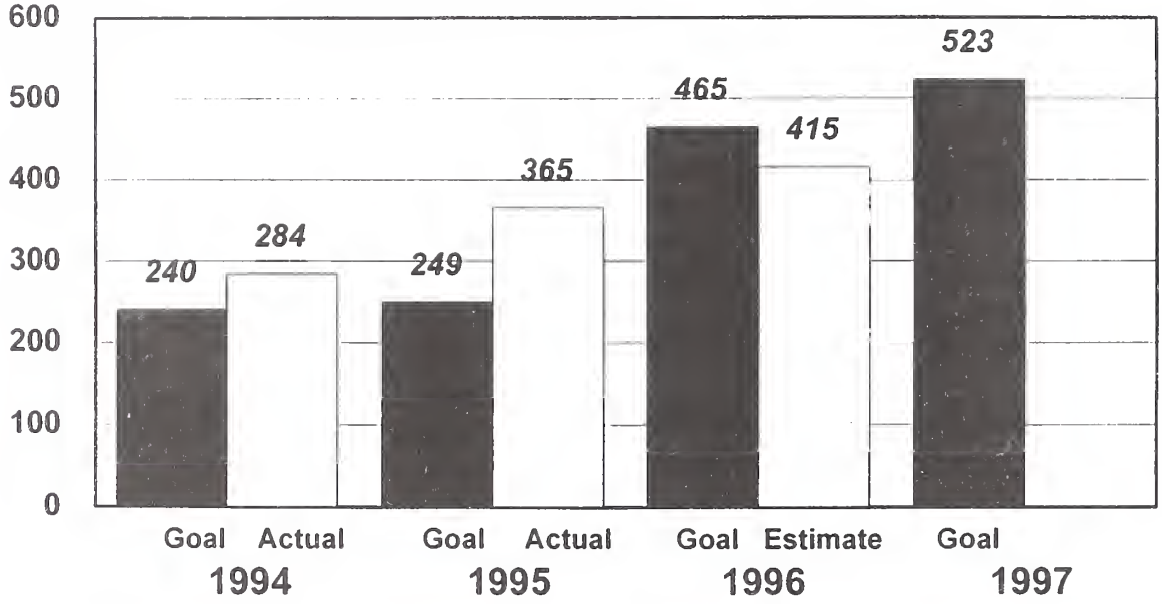
Beef & Beef Variety Meats

1996	1997	Annual Increase
50,000 mt	67,000 mt	34%

- ➔ U.S. Competitive Pricing
- ➔ Expand Market Beyond Livers
- ➔ Distribution/Transportation Issues

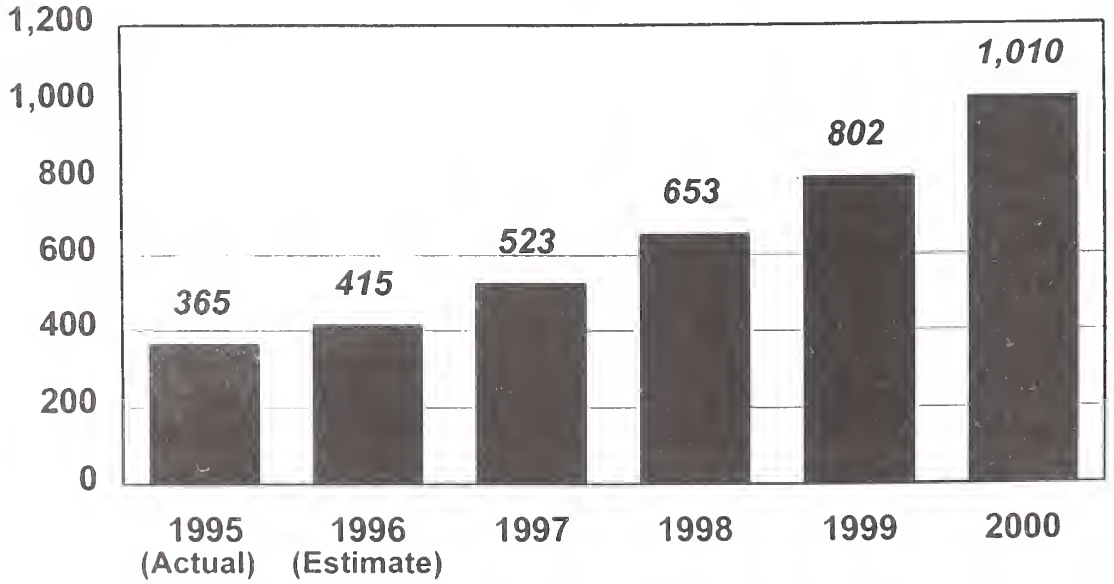
U.S. Pork & Pork Variety Meats Annual Goals vs. Actual Exports

(Thousand Metric Tons)



USMEF Export Goals Pork & Pork Variety Meats

(Thousand Metric Tons)



USMEF Export Goals
Pork & Pork Variety Meats
(Thousand Metric Tons)

Country	*'96*	*'97*	*'98*	*'99*	*'00*	*Increase '96 - '00*
Japan	195	224	250	277	318	63%
Mexico	79	92	119	153	197	149%
HK/PRC	32	50	90	130	200	525%
Russia	25	38	50	57	60	140%
Korea	10	15	30	48	70	600%
Others	74	104	114	137	165	123%
TOTAL	415	523	653	802	1,010	143%

JAPAN
Pork & Pork Variety Meats

1996	*1997*	*Annual Increase*
195,000 mt	*224,000 mt*	*15%*

- ➔ No Adverse Food Safety Issues Arise
- ➔ NPPC Resolves Trade Issues
- ➔ New Realities of the Market Are Addressed
- ➔ No Major Changes in U.S. Price

MEXICO
Pork & Pork Variety Meats

1996	*1997*	*Annual Increase*
79,000 mt	*92,000 mt*	*16%*

- ➔ Peso Stability
- ➔ U.S. Price Remains Stable
- ➔ Economic Growth to Strengthen Middle Class
- ➔ NAFTA Utilization
- ➔ International Competition Does Not Increase

HONG KONG/CHINA
Pork & Pork Variety Meats

1996	*1997*	*Annual Increase*
32,000 mt	*50,000 mt*	*56%*

- ➔ China Pork Liberalization
- ➔ Transportation/Distribution Issues
- ➔ Strategic Partnering
- ➔ Political and Economic Stability

RUSSIA

Pork & Pork Variety Meats

1996	1997	Annual Increase
25,000 mt	38,000 mt	52%

- ➔ Trade Issues Are Resolved
- ➔ Transportation/Distribution Issues
- ➔ U.S. Price Remains Stable
- ➔ International Competition Does Not Intensify

KOREA

Pork & Pork Variety Meats

1996	1997	Annual Increase
10,000 mt	15,000 mt	50%

- ➔ No Adverse Food Safety Issues Arise
- ➔ Market Liberalization
- ➔ Transparency of Trade Regime
- ➔ U.S. Packers Adapt to New Market Realities

The Role of Market Information in a Changing Market Structure

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Introduction

The U.S. Department of Agriculture (USDA) has long been involved in collecting and disseminating market information. In the 1990s, some of the state partners in a federal-state joint market news activity have dropped out or reduced their financial support and participation. The need for continued USDA involvement is being questioned, and some critics argue that private firms could and would take over this function. After all, it is argued, communication is easier than ever. We are in an era where everything is presumably available by internet. Private firms would provide information on a "user fee" basis. The users who benefit directly, not the general taxpayer, would pay for the service. All this leads to an inevitable question: Why is there public involvement in market news collection and dissemination?

Historically, there has always been the notion that public involvement in market news activities is justified because there is a *public good* dimension to those activities. This means that the public receives benefits from market news activities that would not be present if public efforts were not involved. This reason for public involvement was more prevalent in the early discussions than it is today, but it is still very important.

A second, and perhaps even more important, reason for public involvement emerges from the relationship between *the adequacy of the market information base, the effectiveness of price discovery, and the organizational structure of the marketplace*. In the late 1990s, market structure is on everybody's mind. Consolidation and concentration are occurring in virtually every commodity sector, and most producers don't like the trend. But not many of those concerned about the trend recognize the relationship between price discovery and structure. *Market failure due to ineffective price discovery processes prompts moves to concentrated markets and non-price means of coordination.*

This latter issue will be pursued in this brief paper. I believe an important and largely irreversible change in market structure is occurring in substantial part because the traditional price-based exchange systems are failing to achieve inter-level coordination of action in our production-marketing systems. Though important in all food and fiber sectors, in no sector is this issue more important and more visible than the livestock/meat sectors. In pursuing this issue and exploring the importance of adequate market information, my working hypothesis is that the livestock and meat markets will continue to consolidate and move to non-price means of coordination. Further, this trend will occur at least partly because of market failure due to price discovery processes that are less effective and efficient than they could be. One reason price discovery is and will be less effective is the lack of a public willingness to support the gathering and disseminating of important market information.

The Market Structure Connection

The conventional marketing systems for food and fiber products have been open market exchange systems. Prices and pricing signals have been the coordinating mechanism and have, presumably, been the agent of change to ensure that what is produced is consistent with what is in demand at the consumer level. To be effective in this important role, the prices evolving from auctions and one-on-one direct negotiations need to be based on good information. Grades must effectively categorize important value-related product attributes at the consumer level, and the product attributes identified by the grades must be brought into the pricing process. Price signals can be attached to product attributes of importance only if they are identified. Further, both buyer and seller must be negotiating from a common understanding of what constitutes value. And very importantly, the seller--especially the small producer of agricultural products--must have something approaching an equal knowledge of the underlying supply-demand forces that determine the "true" underlying but unobservable market-clearing price. If these conditions are not met, then the price signals are not sharp, the communication effectiveness of the entire system declines, and we face the possibility of what Williamson and others started to identify as early as the late 1960s and early 1970s as a "failure" of the open market price-based systems.

The efforts by Williamson and by Purcell in the 1970s continued a theme, a warning, that other agricultural economists had raised in the 1950s and 1960s: *If the price-based open exchange systems do not improve in terms of inter-level coordination of activity in our production-marketing systems, they will eventually be replaced by contracts or vertical integration which allow the needed inter-level coordination to be ensured by management directives.* Mighell and Jones, in a pioneering effort, had laid out in the 1960s ways to achieve vertical coordination. Included in their matrix were some of the non-price ways (contracts, vertical integration) of achieving coordination that we are seeing today. Purcell and Dunn and Rathwell and Purcell found evidence of goal conflicts and operational inconsistencies that blocked inter-level coordination in the beef systems of the 1970s. Williams and Farris documented efficiencies and lower cost production in integrated production systems compared to systems where each level of activity involved a purchase and later sale in the open market.

In the late 1990s, there is an abundance of evidence to suggest the long-standing warnings are coming true--that price-based markets that are not effective in achieving inter-level coordination across technically related economic functions will be replaced by contractual arrangements and integrated structures. Alchian and Demsetz had put this issue forward in an interesting way over 20 years ago. They discussed types of cooperative action and organizations and advanced the idea *that a firm, by bringing a number of the technically related inputs and functions under its control, starts to compete with the conventional markets. The firm becomes the coordinating mechanism, and it ensures a level of coordination the price mechanism may be unable to achieve in the presence of limited information and within existing market structures and related profit-center behavior.* The market structure tends to change to earn those benefits of coordination. That is precisely what the pork processors of 1997 are doing as they control genetics, reduce quality variability, schedule slaughter from owned or contracted production programs, and bring on-line low-cost operations which can accomplish an alignment between what is being produced and what modern consumers demand.

In cattle, it is the controversial *captive supplies* that would appear to have developed because of the long-predicted failure of the open market price system. It is true that these approaches to procurement came during the time of packer concentration, but one has to reflect on the *why* of the changes. Some would argue packers use captive supply cattle to drive prices down, but the research evidence (Ward *et al.*) shows no major price impact. It may be that the need to keep costs under control and to achieve inter-level coordination was the motivating force.

Paul, among others, argued many years ago that certain production processes will be combined under a single management (or combined by contract) because of the joint nature of the production process and the related need for joint decision making. The problem a firm faces is one of finding the optimum vertical or inter-level enterprise combination for the firm. Paul identified technological change and the desire for risk-sharing arrangements as factors redefining the vertical scope of firm activity and how firms work with others. The vertical disintegration of the traditional corn-hog, farrow-to-finish farm combination into separate farrowing and finishing functions is a good example. Changing technology resulted in a new vertical enterprise combination and a new industry structure. That process has now taken a turn toward very close working relationships between processors and a few mega-sized hog finishing operations, and industry structure is changing rapidly.

Paul recognized that changing the vertical organization of the production-marketing system may result in new patterns of risk distribution. He emphasized that as the degree of economic specialization changes, new risk-sharing arrangements evolve. A firm might choose to integrate vertically with an adjacent stage even if costs are not reduced so long as the variability of costs and thus rate of return variability was reduced. In fed cattle, packers have said in public interviews that contracting cattle *does* reduce their costs. *There are clearly powerful reasons to move to non-price means of coordinating the technically related stages in the livestock-meat production and marketing system if the traditional price system fails to achieve that coordination.* The traditional price system has failed when price discovery is ineffective, when there is no pricing to value, and when price incentives do not prompt consistent quality and/or the needed regular flow of hogs or cattle into a processing facility.

There is, then, a possibly compelling reason for public involvement in information and outlook, a reason that has not received enough attention. *If society values an atomistic structure in production agriculture made up of many independent producers, then there is reason to seek to improve the performance and effectiveness of the pricing mechanism by improving the information available to buyers and sellers*. That could mean, for example, aggressively reporting the pricing of fed cattle and hogs on a carcass evaluation basis to eliminate the uncertainty that still characterizes liveweight purchases, especially in cattle. Clearly, grades would have to be effective. There could be no significant value differences within grade tied to tenderness or other important determinants of palatability and consumer satisfaction. Critics are calling for an abandonment of public beef grades in early 1997 precisely because there *are* consumer-important value variations within current grades. It *could* mean an even more pervasive and more sophisticated system of market news than now exists. But one can argue investments in market news are worth it because our conventional market systems, which we have valued so highly in other policy arenas, such as rural development and in our farm programs, are clearly at risk.

The critic might again object to all this and argue that the private sector will provide the needed information. Gorham argued some years back that private services tend to "fill in the gaps" rather than compete with USDA and other public sources. He is probably still right today. The need for information might have to reach crisis proportions before the for-profit private sector would overcome all

the discounting for uncertainty and make investments. Even then, a "profit wedge" is driven into the process and would tend to mean private firms would offer less information than do public agencies.[1] And before the crisis swells to proportions such that private firms *do* fill in, it may well be that the large firms in our increasingly concentrated markets become the "market" and eliminate reliance on prices--which is, to repeat, exactly what is happening in pork today. *It does in fact appear that there is a compelling reason for the public to ensure that quality information is available to buyers and sellers in our price-based exchange systems if we value those systems and value the viability of the independent entrepreneurial producers who have long been the hallmarks of those systems.*

In a recent and special research effort specifically designed to estimate the impact of market information on price discovery for fed cattle, Anderson *et al.,* found (1) fed cattle prices became more variable as access to market information was decreased in a controlled experiment, (2) the use of contract (captive supply) arrangements between cattle feeders and packers increased when market information was withdrawn, (3) there was more reliance on cost and break-even information when information on markets and market prices was withdrawn, and (4) there was more tendency for slaughter weights to vary from the level that was most cost effective for the entire sector. There are, based on this important work, clearly negative implications to social well-being from the withdrawal of market information. The increase in variability of fed cattle prices means added risk exposure, a risk that must be paid for by someone. Research shows that when exposure to risk increases, system participants (especially processors) will have to extract a larger margin for their services if they are to stay in business. The result in the cattle sector will be lower fed cattle prices in the short run and reduced supplies of beef, higher prices to consumers, a smaller beef sector in the long run, and pressures to move to non-price means of coordination.

Looking Ahead

The discussions about public involvement in information gathering and dissemination will continue as we move toward the year 2000, and they will intensify. The criticisms of recent months and years will not disappear. We are caught up in an era of change. It behooves us, then, to try to focus attention on the truly important issues and to move the dialogue about policy formation into the arenas where the public interest is or should be most apparent.

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[1] Let

MC = marginal cost of collecting and disseminating market information,
MB = marginal benefit of information to decision markers, and
Π = profit needs of private firms to make investments in market new activities.

The marginal value of each additional bit of market information declines consistent with the lows of diminishing marginal returns. To society, more information is worth an added public dollar so long as the marginal benefit to society, MB*, exceeds its MC. Thus, information would be collected and disseminated in accordance with the expression:

Collect so long as $MB^* \geq MC$.

But for the private firm, (if we assume $MB \cong MB^*$), the expression is

Collect so long as $MB \geq MC + \Pi$.

Thus, a "profit wedge" is driven into the process and less information would be collected and disseminated.

It will not be easy. We need a broad and analytical treatment of an area of activity that has not been, historically, conducive to breadth and analytical rigor. In the collection and dissemination of economic information, the public involvement spans the land grant universities, state agencies, and many agencies within the bounds of the U.S. Department of Agriculture. It is, then, not difficult to see why actions and policies are often fragmented and micro in orientation when a broader, more nearly macro, and analytical approach that ties all the pieces together is what is needed. And it is very difficult to conduct research in this general area that generates empirical measures of the private and/or public benefits to market information.

Having recognized it will not be easy, it is imperative that we get it done. The public interest in the late 1990s goes far beyond the historical thrusts of getting information to the small producer to level the playing field and to try to ensure producers will be protected by at least a modicum of competition between and across the increasingly large buyers. Those were and still are admirable goals and we should not ignore them. But in the late 1990s, the public information efforts are being carried forward in a significantly different operating environment. Markets for food and fiber products are concentrated to an extent without historical parallel. There are huge and powerful players, especially at the processing level, who are becoming increasingly impatient with perceived inadequacies in our traditional exchange-oriented and price-driven marketing systems. They are facing powerful cost and profit-related economic reasons to act. The price-based systems will be replaced as coordinating mechanisms if those systems do not become more effective.

There are numerous and clear signals in our farm and rural development policies that the public is interested in perpetuating an economic structure characterized by a number of aggressive, innovative, and competitive independent entrepreneurs. That type of structure typically relies on transaction prices to move the food and fiber product from the producer as a profit center to the processor as a separate (but technically related) profit center, and on up toward the final consumer. If the large processor in our increasingly concentrated livestock markets gets the raw material inputs it needs from independent producers when needed and at a consistent quality, the incentive to integrate vertically into production and/or control production by closely specified contractual arrangements is diminished. It is reduced to the incentives associated with being more efficient in production, and there are numerous indicators that an independent producer who is large enough to spread fixed costs over at least modest production levels and can put together truckload lots of consistent, high quality hogs or fed cattle, can compete in production efficiency. *It will be the lack of inter-level coordination--the wrong quality, high levels of quality variation, poor or unscheduled timing in the quantity flow into the plants--that will drive the processor towards coordination by non-price means and brings the demise of the traditional price-based systems.* It will be ineffective price discovery, not an overwhelming cost advantage, that will prompt processors to move to non-price means of coordination.

It is essentially a tautology that pricing, price discovery, pricing accuracy, and pricing efficiency are tied closely to the available information base. Price cannot be effective as a coordinating mechanism if the information on which it is based is inaccurate, inappropriate, or comes up short along important dimensions. A pork processor who is fully responding to the fresh pork consumer market by offering a high quality cut of branded fresh pork that reduces preparation times in the kitchen must have the right hogs in terms of quality and timing if brand identification, promotion, and guarantees of satisfaction are to be extended. But if the livestock producer is to meet those needs, what the processor needs must be made clear during the pricing process. *All significant value-related dimensions of the product offering must be brought into the pricing process, and that pricing process must be reported in some depth and detail.*

The need, then, is for quality information along a broad continuum. Grades and product descriptors must be refined and highly specific. If there is still lots of value variation within #1-2 barrows and gilts weighing 230-250 lbs., we need (and we *are* getting) more refined grades, descriptors, and transaction terminology. If the intensity of current dialogue is any indication, the need is much more pressing in beef. *If* there is in fact significant eating quality variation within the Choice grade, *then* it has to be broken out, categorized, and identified. *Effective price discovery is impossible unless those consumer-important traits are identified and reported by market news disseminators. If these things are not done, there are powerful economic reasons (costs, quality assurances, inter-level coordination) for processors to bypass the pricing system and go to non-price means of coordination.*

If we have lacked the public will to make the investment needed when the traditional reasons for public involvement in market news were examined, perhaps the willingness will be there if we recognize that we are also setting the stage for the organizational structures we will see in the decades ahead. We clearly do care, as a collective public, how our markets are structured. And anyone who does not recognize that failures in our pricing mechanisms (traceable at least in part to inadequacies in our market and market-related information base) have contributed to the demise of our pricing systems in many sectors of our livestock economy has not been paying attention to the developments of the 1990s.

For many market-related reasons, then, we *must* have high quality information that is not fraught with error and is not presented in such a way that still allows for widely varying interpretation by users. Pricing to value must be accomplished. Risk associated with significant price volatility and uncertainty that can be traced to the lack of market information must be eliminated or reduced to tolerable levels. Whatever the distribution mechanism, these needs have to be met and we have to do what is necessary to ensure they are met. If there is no other overriding message in the literature, there is one that consistently points to a positive net value for public involvement to help ensure competitive prices and efficient economic activity. If that traditional and persistent message is not sufficient to prompt us to fix a system that appears to be broken along several dimensions, then I hope extending the reasons and the discussion to include helping to ensure the viability of pricing systems and a market structure we have valued as a society will prompt the needed actions and the needed commitment.

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CONCENTRATION IN THE LIVESTOCK SECTOR A PRODUCER'S PERSPECTIVE

by

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Member USDA Advisory Committee on Agricultural Concentration

The participants in every link of the beef, pork, and poultry chains are becoming fewer and larger. The economic forces driving these changes are similar to those that are bringing about increased concentration in the rest of our economy. The USDA Advisory Committee on Agricultural Concentration (the Committee) was assembled to review the impact of increasing concentration on U.S. agriculture, and to recommend new public policy in areas where the Committee felt change was needed.

The membership of the Committee included agricultural economists and representatives from the production, marketing, processing, and transportation sectors of the industries that were to be reviewed. Their political philosophies covered the entire spectrum of the agricultural policy rainbow. In spite of the diversity of the group, the committee did reach consensus on a number of broad policy recommendations and unanimously endorsed a policy to support and improve market information as a vital component of a competitive marketplace. The committee made a number of recommendations for the livestock industry in four areas; antitrust and regulation, a new disclosure policy, vertical linkages, and cooperatives/producer bargaining.

The committee found that major differences exist between the beef, pork, lamb, and poultry industries. The industries differ significantly with respect to their structure, marketing and pricing systems, biological capabilities and limitations, business practices, and current levels of industry cooperation, concentration, and coordination. There was recognition that blanket recommendations for one species could have serious, unintended consequences if applied to the entire meat industry.

U.S. agriculture is clearly in the midst of evolutionary change. Vertical integration is the predominate structure is some industries, and nearly all of the rest of agriculture is moving to much greater coordination throughout the production and marketing chain. The reasons for these changes are numerous. Two of them are: targeted production gives better quality control and greater responsiveness to consumer demands; and vertical coordination often results in lower costs and improved efficiency throughout the chain.

As the world economy becomes increasing interdependent, large multinational companies have a significant competitive advantage in opening and expanding export markets. An increasing share of U.S. exports are value added commodities. In meat exports, our initial penetration into a commercial export market is often with our very highest quality meat products. The large meat packing firms have a choice: (1.) do they obtain the needed top quality cuts by sorting from the general production run; or (2.) do they ally themselves with producers that will provide animals that will meet the product quality and production standards their import customers demand. It is my contention that a growing number of meat exporters will choose the second option.

Some of the producers who testified before the committee felt that these trends were threatening their way of life, and that public policies should be developed to stop or reverse the momentum of change. I do not believe this is a likely outcome. My belief is that we should focus on the new reality of coordinated production and the issues that must be addressed if farmers and ranchers are to become partners rather than pawns in the U.S. food system.

The poultry industry is the most integrated in the meat sector. The committee heard divergent testimony as to the viability and fairness of grower contracts. In areas of the country where multiple processors were competing for contract growers there seemed to be satisfaction with economic returns to growers and the relationships between the integrators and the contract growers. In areas where a single processor was the only integrator available to growers, there tended to be much greater dissatisfaction on the part of the contract growers. Competition matters and a means to insure a balance of economic power is essential in areas where competitive forces are not in balance.

Producers should be able to bargain with first handlers as a group without fear of recrimination. At the same time, the processor or integrator should retain the right to deal individually with a grower who does not meet the performance standards of the production contract. The right of producers to organize under the Capper-Volstead Act must be preserved. The committee recommended that the Agricultural Fair Practices Act of 1967 be

amended to require handlers to engage in good faith negotiation with producer cooperatives and networks, and to purchase products from these entities without discrimination. As a growing share of agricultural production is controlled by production contracts, a proactive public policy in this area is vital to maintain the opportunity for good economic returns to the production sector.

While the pork industry is not as integrated as poultry, it appears to be following a similar path. Many producers hope that a model of networks and coordinated production will prove to be competitive with players in the industry that attempt full vertical integration. An important ingredient for individual producers will be transparency regarding marketing arrangement qualifications. Producers will need to know what they must do to qualify for participation in future marketing arrangements.

The capital requirements for the live animal production necessary to supply a modern pork slaughterhouse are very large compared to the poultry industry and will be an impediment to full integration. The challenge for independent growers will be to remain cost competitive and to provide large numbers of animals that produce cuts that are consistent in size and high quality. In addition a system to insure that the quality of the products offered to the consumer is constantly being upgraded will be a vital ingredient in competing with fully integrated producers.

The latest data I have from Grimes and Rhodes is that 71 percent of the hogs sold in 1994 were purchased on a carcass merit basis. Thirty-eight percent of all hogs purchased that year were through some form of formula pricing. Local data bases I have seen in my home state would indicate that producers combining carcass merit with formula pricing are receiving higher returns than other producers. Packers obviously have an interest in, and are willing to pay for uniform lots of high quality animals that are available for processing on a predictable schedule.

At some point in the future as the cash market for live hogs becomes thinner, formulas may be based upon downstream markets, thereby making accurate, timely data on wholesale and retail prices more critical to the farm pricing decision. Research describing the transition from spot markets to other pricing arrangements in other commodities may help target issues the pork industry should address. In addition, USDA/industry efforts to improve price reporting systems on the wholesale, sub-wholesale, and retail sectors will be vital to the transition to a new price discovery process.

The majority of the public testimony the committee heard covered concentration issues in the beef industry. Eighty-two percent of fed cattle are slaughtered by the four largest beef packing firms. The three hundred

largest feed lots account for fifty-seven percent of the fed cattle sold. There was widespread distrust of the price discovery process. It was asserted that there have been times when most of a week's fed cattle trade happened in a thirty minute window. Many producers were concerned about captive supplies of packer controlled slaughter ready cattle. Many felt that packer ownership and the use of marketing agreements and forward contracts allowed beef packers to depress the prices offered for open market cattle. Other producers gave testimony that marketing agreements allowed them to enhance their selling price and that they used forward contracts to manage risk.

The intensity and emotion of some who presented testimony was a reflection of the reality that fed cattle prices where at a ten year cycle low and feed grain prices were soaring to all time highs. These two events dealt a double blow to feeder calf prices. Many who testified came from ranches that had few economic alternatives other than converting grass into meat protein. Cow-calf operators and the rural communities that depended on them were in a genuine crisis.

The committee made a number of recommendations that would increase the amount of market information available to the beef industry. Some of the proposals were:

1. Contract or formula pricing premiums and discounts, based on carcass merit should be captured and reported.

2. Require timely, accurate price reporting of all packer livestock transactions, including data on captive supply.

3. The development of a value matrix for cattle similar to the "Lean Value Direct Hog Trade" that AMS Market News makes available to the pork industry.

4. USDA should develop a standardized list premium or discount categories for carcass merit purchasing.

5. The committee asked for considerable increase in volume and specificity of market information available on the wholesale beef trade.

6. USDA should encourage the development of a close trimmed boxed beef futures contract as an additional means of price discovery.

The committee heard from some players in the industry who felt that the additional market information requested was excessive. I believe the requests are a reflection of industry concentration and the relatively low levels of coordination in the beef industry.

Information the committee received indicated that small price differentials are paid for quality differences in slaughter cattle. Beef representatives on the committee informed us that some custom feedlot operators attempt to negotiate the same selling price for all cattle sold from their feed yards to a packer in a given week. I believe that if these practices are widespread,

they are detrimental to the long term interests of the beef industry. In our economy change happens through incentive, and steps need to taken so that each sector of the beef industry has a clear economic incentive to improve quality.

It should be noted that the beef industry concentration and price determination studies furnished to the committee showed that cattle prices were within predictable ranges. The recent decision by Tyson Foods to exit beef and pork processing is instructive. According to published reports, the management of the company felt that it could get higher returns for its capital and management by focusing on poultry. This is evidence to me that these sectors of the beef and pork industries are competitive.

On the other hand, the recent price fixing convictions in the feed ingredient industry remind us of the need to be vigilant. The committee made a number of recommendations that advocated increased monitoring and enforcement of antitrust and regulatory policy. However, there was a recognition that in the current environment, antitrust actions have become much more complex and difficult.

Daniel I. Padburg, Ph.D., who served as chairman of the committee, suggested that we consider a "market based disclosure policy" as an alternative to the traditional methods of antitrust enforcement. The committee supported inclusion of this proposal in the report. Many of the committee recommendations for more detailed market information would facilitate such a policy.

I quote from the report, "We conclude that antitrust policy would be more positively and effectively enforced if anticompetitive practices and behavior were more transparent and visible. Scarce resources and opportunities for productive government-business relationships would not be wasted in investigations that eventually whither for lack of evidence--or worse, because they were unjustifiable in origin... A disclosure policy can provide a basis for harmonious and productive interactions between the food industry and farmers as well as consumers...Finally, and importantly, disclosure makes the unfair use of market power against farmers more visible, easier to observe, and therefore, more effectively and quickly corrected.".

I hope this portion of the committee report is given serious discussion. There is a strong sense that the old ways of regulating business practices are incompatible with responsible oversight of the new food system in the United States.

FARMERS' INFORMATION NEEDS IN AN INTEGRATED MARKETPLACE

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Associate Professor, The Ohio State University

A striking feature of structural change in the food system over the past forty years has been the change in the way in which agricultural producers and processors are vertically coordinated. Traditionally, coordination has occurred in open markets, but now there is a trend in many sectors away from open market transactions to coordination through either some form of contracting between producers and processors or integration where the two stages are combined within a single firm. In the case of broilers, about 90 percent of production occurs under contract, while in turkeys, 60 percent of production occurs under contract, and 28 percent under vertical integration. Other markets where contracting/integration are important include eggs, fruits, vegetables and sugar beets. More recently, hog production has exhibited a trend towards contracting, and many observers expect this to continue.

Various reasons have been put forward for increased integration in the agricultural sector. Most commonly, it is argued that closer vertical coordination has been driven by the requirements of processors for more precisely defined product specifications to meet changing consumer demands which have, in turn, been supported by changes in the technology of production. Whatever the causes of integration in agriculture, it raises an important question as to what type of information government can supply to a marketing system that is increasingly characterized by contracting and vertical integration.

Orthodox Arguments for the Supply of Public Information

The existing public supply of information to the food and agricultural sector can be divided into two types, current price information and commodity outlook information. The underlying rationale for government supply of both these types of information is the notion that there will be an undersupply of information from the private sector, i.e. information is what economists call a public good.

Public price reporting has generally been aimed at reporting spot market prices of commodities which still retain their identity, and, in the case of commodities where there is farmer/processor integration, prices are reported at the first sale of the processed product, e.g. processed broilers and turkeys.

Public price reporting had its roots in concerns over the possibility that farmers were being exploited by processors and other traders of agricultural commodities, but has subsequently been justified on the grounds that it aids economic efficiency in the food marketing system. In particular, it is argued that price reports provide the benefits of a central market without the need for all market participants

and products to be in a single location. In addition, by establishing product value, exchange is facilitated.

In the case of commodity outlook information, the basic objective has been to supply forecasts of future prices and quantities, given decision makers are operating in an environment of uncertainty about these variables. The public supply of outlook information to agriculture has begun to be questioned in recent years.

To some extent the public good argument has been weakened because of the growth in the supply of information from the private sector. In addition, many economists have suggested that if economic agents such as farmers utilize available information optimally and do not make systematic forecast errors, then resource allocation cannot be improved through the supply of public information on, say, future market prices. This argument, however, assumes that information is costless and that economic agents learn instantaneously from their forecast errors. Therefore, the public supply of information is still a means of aiding resource allocation.

Supply of Public Information and Contracting

Prices

In an environment of increased contracting, do these arguments for the public supply of information make sense? Where there are hybrid markets consisting of spot markets and contracting, the traditional arguments for information supply still hold. As contracting and vertical integration increase, however, the decline in the use of spot markets means that either publicly reported spot prices disappear altogether or they reflect such thinly traded markets that they are no longer of any real economic benefit.

On the face of it this seems to suggest a potential economic loss. In particular, producers and contractors have no basis on which to conduct negotiations over compensation, and related to this there is the possibility producers will be subject to opportunistic behavior by the contractor. However, the forces pushing markets towards contracting, and the logic of contracting itself suggest that such a loss will not necessarily occur.

Many observers argue that traditional price signals have become inadequate in terms of transmitting consumer demands for product characteristics such as low fat content and food safety, hence the shift to contracting by processors. Contracts allow the processor to provide farmers with much more precise product specifications. While the contractor has some control over this as they often supply key inputs and managerial advice, they must still provide producers with the correct economic incentives to produce the right type of product.

Risk

When farmers operate in open markets, they face two sources of risk: production risk due to factors such as climate and disease, and price risk which affects the variability of their income. If farmers are averse to bearing such risk, then outlook information that reduces the degree of uncertainty will aid both their production decisions and increase their economic well-being.

A key characteristic of contracting is that much of this risk is transferred from the producer to the contractor. For example, in hog production, we typically observe contracts where the producer receives a set payment per finished pig plus various performance incentives. The set payment provides the hog producer with some insurance against production and price risk, i.e. they receive this payment regardless both of how well they perform on the contract, and the price of finished hogs received by the contractor. The performance incentives mean that the hog producer is not fully insured against production and price risks. The reason for this is that, because it is costly for a contractor to fully monitor the effort of a hog producer, the producer must be provided with some incentive to perform well, and, as a result, the hog producer will bear some of the risk.

Contracting, therefore, does provide a degree of insurance to producers against production risk, and, hence, reduces the need for the public supply of outlook information. For example, in a comparison of independent production and contracting, researchers at North Carolina State University have calculated that broiler price risk is the major component of risk that an independent grower would face, and this, along with production risk, is shifted to the contractor under the typical broiler contract (Knoeber and Thurman).

Nevertheless, while producers benefit from a reduction in short-term production risk, and they are insured against price risk, they are exposed to long-run capital risk due to the fact that contractors often require that they supply necessary production capital, e.g. broiler and hog houses. This suggests that there would be economic value to information on the long-run prospects for demand for the contractor's product, and, hence, the rate-of-return to capital.

As there are usually only a few large contractors and many smaller producers, producers are uncertain about the nature of contracts on offer as they are privately negotiated. Therefore, producers may be concerned about selecting the firm for whom they will contract. The producer may require information concerning the types of contract on offer, the terms of those contracts, the contractor's financial viability, and their commitment to the contracting arrangement. Information on such factors could be supplied by either a public agency or private sources, although there is a question concerning the extent to which public agencies should/can be involved in monitoring what are private contracts.

From the contractor's standpoint, while input supply risk is reduced through contracting, they are exposed to additional risk through the shifting to them of some of the producer's risk, and also downstream price risk. This may not matter if the contractor can insure against such risk, e.g. in the broiler industry, in excess of 50 percent of production is accounted for by publicly-traded firms,

whose stockholders can minimize risk through holding diversified portfolios. Nevertheless, there may be a premium on ensuring the availability of information on future consumer needs for the processed product and detailed information on retail prices.

In summary, traditional supplies of public information to agriculture may no longer be relevant where there is increased reliance on contracting. This follows from the fact that contracts provide some insurance against risk to producers, and the contractor, in meeting the diverse demands of consumers, has to provide the correct economic incentives to producers. However, as farmers' information requirements change with the increase in contracting, there may be a need for the public supply of information on a wide range of aspects:

- the types and terms of contracts available
- the financial viability of the contractor(s)
- the long-run capital risks of contracting
- the balance sheet effects of contracting
- the financing arrangements available
- the performance of contracts
- downstream market information

This type of information would aid farmers in their capital investment decisions as they consider either entering contractual arrangements or exiting the industry if they are already small-scale independent producers. In addition, such information may aid in reducing price uncertainty facing contractors, however, it is moot whether this should be publicly supplied to large corporations well able to bear risk.

OVERCOMING CHALLENGES IN HIGH VALUE MARKETS WITH A FOCUS ON THE PRODUCTS

Joanna Savvides
Export Services Manager, Campbell Soup Company

AGRICULTURAL OUTLOOK FORUM '97

OVERCOMING CHALLENGES IN HIGH-VALUE PRODUCT MARKETS

FEBRUARY 25, 1997

CHARTING A NEW COURSE

AGRICULTURAL OUTLOOK FORUM '97

U.S. AGRICULTURAL FOOD EXPORTS

THE FUTURE IS IN:

HIGH VALUE PRODUCTS

PERCEIVED AROUND THE WORLD AS HIGH QUALITY

CHARTING A NEW COURSE

AN EXAMPLE OF THE INDUSTRY'S PERSPECTIVE:

Achieve Growth in Exporting
High-Value Products:

What Are the Challenges

How Do We Overcome Them

AGRICULTURAL OUTLOOK FORUM '97

ACHIEVE GROWTH:

PREFERRED AROUND THE WORLD

Campbell

Brands

CHARTING A NEW COURSE

THE CHALLENGES:

- Geography
- Product
- Implementation
- Financial

FIRST CHALLENGE:

GEOGRAPHIC POTENTIAL

Determine the country/market:

1. Per capita income/Urbanization
2. Country growth/GNP
3. Country risk/Political stability
4. Market size
5. Consumption per capita
6. Market share
7. Tariff and Non-Tariff trade barriers

SECOND CHALLENGE:

THE PRODUCT

1. **Determine the right products for the right markets**

Market Research → consumer need/customization
→ point of difference/uniqueness
→ brand power

2. **Bring the product to the market**

Compliance: → import regulations
→ product registration
→ ingredients
→ labeling

THIRD CHALLENGE:

IMPLEMENTATION

- Determine your partner: Distributor/Joint Venture
- Be in the proper distribution channels
- Build brand power with: product news
  advertising
  sampling

AGRICULTURAL OUTLOOK FORUM '97

FOURTH CHALLENGE:

FINANCIAL

- Determine the right price for the market
- Be profitable (short term/long term)

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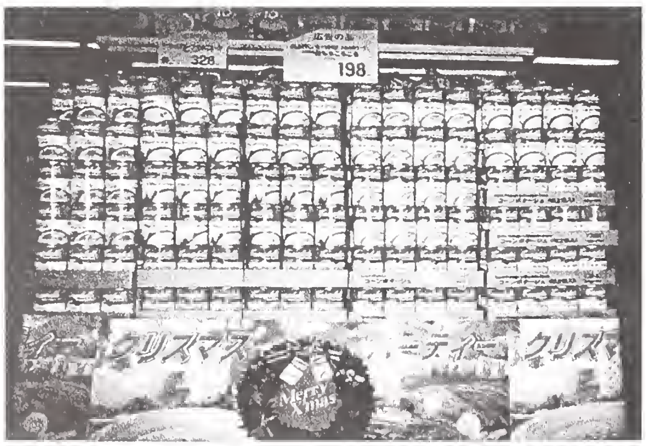
AGRICULTURAL OUTLOOK FORUM '97

EXAMPLE: JAPAN



CHARTING A NEW COURSE

MARKET POTENTIAL:

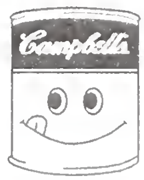
- Large population (125mm)
- High income ($26,000) per capita
- High soup consumption ($550 mm soup market)
- Trade barriers coming down (7% tariff)

PRODUCT:

- Special varieties (Corn Potage, Double Corn, Cream of Mushroom, Cream of Pumpkin, Cream of Carrot New England Clam Chowder)
- Japanese labels

IMPLEMENTATION:

- Manufacturing in Sacramento, CA
- Joint venture with Nakano Vinegar
- Brand power - "Mr. Campbell"



FINANCIAL:

- Pricing acceptable

Changing Agricultural Institutions and Markets: The Farm Credit Outlook

by

Charles Dodson[1]

Farmers demand billions of dollars of capital to finance farm real estate, machinery & equipment, livestock, and annual operating expenses. Through credit markets, lenders were supplying $155 billion of this capital at the end of 1995. Total farm business debt is expected to rise in 1997 for the fifth straight year to about $160 billion. Lenders and farmers, for the most part, enter 1997 in a financially strong position. Some problems do exist but are mostly confined to cattle producing regions in the Plains and Southwest. Over the longer term, farm credit markets are likely to be influenced by evolving structural changes occurring in the financial and agricultural sectors. Or more explicitly, the long term outlook is going to be determined by who is going to borrow and who are going to lend. But, the diversity of US agriculture and its lenders makes this determination more difficult. There is no "typical" American farmer with a standard demand for credit. Agricultural credit markets consist of numerous groups of agricultural producers, many with unique demands for credit. Currently unfolding structural trends ,such as industrialization and consolidation of farms, may result in commercial-sized farms becoming more diverse and segmented in their demands for credit. Meanwhile, there is likely to remain a large and viable small farm population. Also, lending institutions have undergone substantial structural changes over the past 10 years with more changes likely. First, I shall discuss these evolving trends by examining the current and expected credit demands for small and commercial-sized farms. Next, I will address some the trends occurring among the institutions providing credit to farms.

Credit Demands for Small Farms

About 1.5 million US farms are considered small or noncommercial with less than $50,000 in annual sales. Since smaller farms typically do not fully employ the operator, most operators receive significant income from nonfarm sources. Small farms produce little and, as a group, make only minor contributions to the overall production of US food and fiber. Since much of their farm capital is in the form of real estate or in the operator dwelling, farm debt may be more important as a method of financing a "rural lifestyle" than for farm production. Compared to larger farms, small farms are less likely to utilize debt with less than half having any outstanding debt. And farms which are indebted owe relatively small amounts of debt. About 350,000 of these small farm operators consider themselves retired with little current need for or expectations of borrowing.

But, because there are so many of them, small farms are a large overall user of credit and are important when considering the outlook for agricultural credit. Small farms owe about 30 percent of the outstanding farm debt. Over half of which is owed to commercial banks. On most small

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[1]Presented at USDAs Agricultural Outlook Forum '97, February 25, 1997, Washington, D.C. Dr. Dodson is a Financial Economist in the Rural Economy Division of USDAs Economic Research Service.

farms, debt is used exclusively for financing real estate. Many of the loans to small farms are more characteristic of housing loans than farm loans with much of the farm debt associated with the operator dwelling. This is especially true for those farms located adjacent to metropolitan regions and with higher off-farm incomes.

Most small farm borrowers represent a low-risk market for lenders. But, servicing this market can be costly since smaller loans are costlier to originate, especially if they are not homogenous. Further development of low cost procedures for originating small farm loans could enhance competition in these markets. Many financial institutions already use loan scoring to minimize time and expense for the lender in evaluating small loans. The use of credit scoring will probably increase, especially with more technical innovations. Improving liquidity of secondary mortgage markets for rural housing could improve the future availability of credit to these groups of borrowers. The Federal Agricultural Mortgage Corporation (Farmer Mac) currently has the authority to purchase rural housing loans for a secondary market. Recent legislation passed in 1996 should enhance their ability to compete in the rural housing/small farm market. Yet, to date, purchases of these type of loans have been insignificant

Credit Demands of Commercial-Sized Farms.
Credit usage among modern commercial-sized farms differs quite substantially from those of their smaller counterparts. Specifically, commercial farms are more likely to owe debt with 75 percent doing so. Larger farms typically owe much larger amounts averaging $220,000 per farm compared to $60,000 for smaller operations. Income from servicing debt for commercial farms is more likely to come from the farm business rather than off-farm income.

The consolidation of farming units will likely continue a long run trend toward more large commercial-sized farms. Industrialization of agriculture means that many of these large farms may take on the characteristics of agribusinesses by processing and marketing their production to consumers. Industrialization would also mean an increase in the number of farms producing highly specialized products requiring specialized equipment. This creates additional challenges for lenders since specialized equipment is much more difficult to collaterize. Loan officers would need to have or develop a knowledge of the specialized commodities. Industrialization can mean an increase in the use of production or management contracts. In these cases operating credit or capital may be provided by the processor rather than a traditional lender.

Suppliers of Agricultural Credit

Historically, farm credit markets have been dominated by commercial banks and the Farm Credit System which provide over half of the farm sector's debt capital. These institutions will likely remain the dominant suppliers, though they will experience increased competition in some markets.

Commercial banks
Commercial banks have undergone dramatic changes over the past 10 years, both in the structure of the banking industry and in their role in providing agricultural credit. Mergers and acquisitions have been a common trend through the 1990s, resulting in an increase in bank size.

Correspondingly, the number of banks operating in the US declined from 14,008 in 1986 to 9,805 in 1995. If the current trend continues, there will less than 8,000 banks in the US in 2000. Some studies suggest that, in the long run, there will be less than 4,000 banks in the US. But, there is no evidence that the consolidation of the banking industry has or will adversely affected the supply of credit to farmers. In fact, over the past 10 years banks' market share of farm debt has increased from 25 to 40 percent. In marked contrast, commercial banks share of short and intermediate term credit needs of nonfarm businesses has been declining over the same period. While the number of banks operating specifically in rural markets has declined, the number of banks operating beyond the local market has increased. Once isolated rural markets are increasingly served by institutions that do not restrict their activities to the local areas and are organized in bank holding companies that permit access to other services and other markets.

Table 1. Debt market shares for commercial farms by farm operator age and net worth.

Operator age/ Wealth	Banks	FCS	FSA	Other
	--Market share (%)---			
Under 40	51	20	6	23
Under $150,000	51	14	17	17
$150,000-$499,999	49	19	3	29
Over $500,000	53	25	3	19
39 > Operator age < 60	43	24	8	25
Under $250,000	44	14	19	23
$250,000-$1Mi.	43	25	8	23
Over $1 Mi	42	29	1	27
Over 60	44	31	8	17
Under $250,000	33	18	d	d
$250,000-$1 Mi.	50	32	9	10
Over $1Mi	41	33	2	24
All ages				
Under $250,000	43	15	18	24
$250,000-$500,000	47	22	8	23
$500,000-$1 Mi.	45	29	6	20
Over $1Mi	44	29	2	25
Corporations	29	20	--	--
All	45	24	8	23

Source: 1995 Farm Costs & Returns Survey Data
Columns add to 100
Underlined estimates have coefficients of variations between 25 and 50 percent.
d - estimate not statistically reliable

Agricultural banks tend to be small (averaging $52 million in assets). However, the consolidation of the banking industry does not necessarily mean the loss of smaller banks. Some believe that over the next 10-20 years, the banking industry will evolve into a system of large regional banks and smaller community banks, many with under $100 million in assets. Despite recent industry consolidation, these smaller banks have been able to maintain their market share. Smaller community banks which operate in rural areas have been very profitable. Their success has been and probably will continue to be defined by an ability to provide personal attention, access to a loan officer, and quick decisions to borrowers within a limited geographic area. For many smaller farming operations who do not require large lines of credit or expanded services, the service provided by a community bank may be preferred.

Larger banks can offer commercial farmers a number of advantages such as a wider range of services and broader expertise. Because they are larger and can access alternative sources of capital, liquidity is less of a constraint in their lending. This may be one explanation as to why banks have been able to increase their share of the farm real estate debt over the past 10 years. With further consolidation along with technological and financial innovations, liquidity is less likely to be a constraining factor when lending to larger farm businesses.

Regardless of age or net worth, USDA data show that banks are the primary lender to most groups of farmers. They are an especially important source of credit to small farms, meeting over half of their credit needs. Banks face little competition from FCS in this market because FCS, is required by law to make farm loans only to *bona fide farmers and ranchers*, thus excluding most small farms. Banks also represent a particularly important source of credit to commercial farmers under 40 years of age, supplying over half of their farm debt.

The Farm Credit System

Over the past 10 years, banks have made tremendous gains in market share at the expense of the FCS. But, the FCS is currently well positioned to compete with banks for farmers's credit needs. It has demonstrated financial strength in recent years as it underwent massive restructuring in organization and procedures. The FCS has access to national money markets and can help provide needed farm credit at competitive rates. FCS income has surpassed $1 billion each year since 1993. In the past two years, the FCS has experienced an inflation adjusted increase in loan volume. By September 1996, FCS at-risk capital, including loan loss allowances and the FCS insurance fund stood at over 20 percent of outstanding loan volume. Nonaccrual loans continue to decrease (by 20% in 1996). No district bank has nonaccruals greater than 2% of loan volume.

The structure of the FCS has changed greatly over the past 15 years with further change likely. Then number of entities within the FCS has gone from 37 banks and over 1000 associations in 1981 to 8 banks and 225 associations in 1996. FCS's primary clientele has been the commercial agricultural producer. But ongoing consolidation of commercial farms means that competition among lenders for these credits will be keen. FCS will face direct competition from banks and life insurance companies for large and mid-sized credits. They will also face indirect competition from Farmer Mac. Nontraditional lenders will be very competitive for the smaller credits. With overlapping boundaries, district banks and associations may be in direct competition with each other. In response, banks and associations may attempt to further differentiate themselves to capture customer loyalty. This may result in further mergers as FCS associations attempt to align themselves with FCS banks who share similar management philosophy or vision for the future.

Freshwater speculates the FCS will evolve into three distinct sets of institutions, each with national lending authority. One group of institutions will focus on providing funds to borrowers at low costs, with far less traditional cooperative relationship with borrowers and its associated range of services. This philosophy is based on a belief that cost is the overwhelmingly dominant factor in attracting and keeping borrowers. A second group of institutions will be of the more traditional management style which existed within the System prior to the 1980s. It will likely characterized by a strong bank and small associations with the bank setting the role in policy and providing support to the associations. Associations will remain locally based and deal on a relationship basis. Much like community banks they will focus on personal attention to borrowers within a limited geographic area. The third type of institutions will be based on a merchant bank type of relationship where a bank provides money to an association but exercises little influence on their management practices. The entire relationship is based on the loan document. If these trends evolve, each group of institutions may service a distinct group of farm borrowers, thus further segmenting the market.

Farm-level data indicates that FCS currently serves a group of more established farmers. FCS market shares increase as operator age and net worth increase (table 1). This could be explained by higher underwriting standards for FCS compared to banks. Because creditworthiness tends to increase with age and wealth, many young farmers they would be considered higher risk borrowers. Another possibility is that higher market shares for older operators could reflect loyalty built up by FCS in previous years.

FCS is a more important source of credit in the Northeast, South, and Mountain states compared to other regions. Production agriculture is more likely to represent a minor contribution to the regional economies in these areas. Banks in these regions may find that the demand for farm loans is insufficient to justify maintaining an expertise in farm lending. With ample alternative investment opportunities, these banks in these regions may forgo farm loans which leaving more of the market to FCS.

The Federal Agricultural Mortgage Corporation (Farmer Mac) is a federally chartered corporation created by Congress to establish a secondary market for farm real estate and rural housing loans and to facilitate funding for USDA guaranteed loan program. To date, Farmer Mac purchases of mortgages has been slow and it remains a minor player in farm credit markets. Over the past year it has been able to purchase only about $150 million in farm real estate loans. Its purchasing activity in the upcoming year will be heavily influenced by such factors as the demand for long-term fixed rate lending, the liquidity in the rural banking system, and competitiveness of Farmer Mac compared to other funding sources. Growth in securitization volume could be accelerated by lenders swapping existing qualified farm loans for Farmer Mac securities. Recent legislation passed by Congress allows Farmer Mac to purchase loans directly from originators along with successful issuances of stock greatly improved their long-term viability.

USDAs Farm Service Agency (FSA)

Once, FSA provided subsidized credit, primarily through direct loans, to financially stressed farm operators unable to obtain credit from commercial lenders. As a consequence of recent legislative changes, FSA now primarily guarantees loans made by private lenders. In 1986, about one-third of total FSA obligations were in guaranteed loans. By 1996, nearly 80 percent of obligations were guaranteed. The Federal Agriculture Improvement and Reform Act of 1996 (FAIR) further emphasizes guaranteed loans with direct loan obligations remaining constant while guaranteed obligations increase. Further, FAIR requires FSA to direct more of its efforts toward beginning farmers. New loans under the direct FO and OL programs can only be made to qualified beginning farmers. Further, much of the FO obligations are to be held for the down payment program which is intended to assist beginning farmers acquire land. FAIR also increases the share of guaranteed obligations to be held for beginning farmers.

Under FAIR, FSA is not intended to be a long-term lender. The Act encourages "graduation" from FSA credit programs (shifting from FSA credit programs to commercial credit sources) by placing stricter limits on eligibility to borrow through FSA programs. Direct FO loans to finance existing indebtedness are now prohibited. Direct OL loans can be used to finance existing indebtedness but is limited to natural disasters or for the refinancing of non-FSA debt. Borrowers are limited to one debt forgiveness which makes them ineligible for additional loans.

As would be expected, direct loans made by USDA's Farm Service Agency have been used heavily by farmers with limited equity (table 1). USDA studies have also shown that through direct loans, FSA supplied over a third of the real estate credit to young farmers with limited equity during the 1990s. While a large share of FSA debt has gone to younger farmers, older farmers have also benefited from FSA programs. But, it is not likely that these older farmers are beginning farmers. Thus, legislative changes implemented by FAIR will mean a fairly significant change in FSA direct borrower clientele.

Life Insurance Companies

The life insurance industry's relationship with agriculture has changed rapidly in recent years. In spite of the changes, life insurance companies have been resilient lenders to the farm sector, occupying an important market segment. In 1996, the life insurance industry had its most active year in making farm loans since the farm financial crisis of the 1980s with $1.8 billion in new farm mortgage loans. Growth is expected to continue into 1997 which would represent the fifth consecutive year of growth.

The six active companies continue to have sufficient loan funds to meet demand and are aggressively competing on rates, terms, and loan-to-value ratios. Companies continue to report that available funds exceed qualified applicants. Life insurance companies have virtually pulled out of the small- to medium-sized farm mortgage market in favor of more agribusiness, timber, and specialty enterprises. They do not have large staffs dispersed throughout the country to service their loans, unlike the FCS and commercial banking system. Companies are emphasizing larger ($500,000 or more) agricultural loans. But, smaller loans can be made to existing customers. New policies have shifted life insurance lending away from the Midwest and toward the Southeast, Delta, and West Coast regions. Data from the early 1990s has shown that the average new life insurance company mortgage loan size among commercial farms was twice that of FCS and four times that of banks. Further, a majority of life insurance company debt to farmers is owed by farms with over $1.5 million in net worth.

Noninstitutional lenders

Noninstitutional lenders are groups of lenders whose primary contact with farmers has been for purposes other than credit. This category is made up primarily of individuals and providers of trade credit. It is fairly common for individuals to finance farm real estate, either through installment land contracts or by the seller holding the mortgage or deed of trust. Data from the early 1990s shows that 30 percent of all commercial sized farms with real estate debt owed something to individuals. One of the key motivations for individual financing is as an enhancement to sell the property. This is a more common method of financing when credit is tight or interest rates are high. During the late 1970s individuals supplied nearly one-third of the farm real estate credit. Their market shares declined, however, as interest rates declined and greater amounts of low interest rate funds became available through the former FmHA in the early 1980s. For the last 10 years, individuals' market share of farm real estate debt has remained fairly stable at 20-25%. As long as interest rates remain low and ample credit remains available to qualified buyers, there should be little increase in the market shares of individuals.

Individuals represent especially important sources of credit to younger farmers and as a method of

financing the purchase of small land parcels. Also, the fixed cost of originating a mortgage loan can make it difficult for commercial lenders to make much of a profit on smaller loans. Yet, it is quite common for farmland to be sold in small tracts which could be valued at less than $50,000.

Trade credit provided by merchants and dealers represents a significant source of debt in financing nonreal estate assets. Trade credit is primarily provided by suppliers of machinery and equipment, cooperatives, processors, and other suppliers of variable inputs (seed, feed, fertilizer, etc). These lenders are most likely to be implement dealers and financing corporations wholly owned by the manufacturer. Recently, there has been an increase in the incidence of these input suppliers providing credit to farm operators. From 1988-93, input suppliers doubled, tripled, or even quadrupled the volume of credit extended.

Trade credit is primarily used to support machinery and equipment sales and to build sales volume or promote customer loyalty. Studies have shown that providers of trade credit tend to have lower costs than traditional lenders on loans of under $50,000. Also, these suppliers can have access to low cost money through the issuance of commercial paper. These aspects can make it very difficult for banks or the FCS to effectively compete for smaller credits. Suppliers of trade credit are most active among commercial-sized crop farms where manufacturers and dealers have secured a 25-percent market share of the intermediate term (over 1 year) nonreal estate debt market.

Coinciding with the growth in trade credit is an increase in leasing of farm machinery and equipment. One-fifth of all commercial crop farms have indicated that they are currently leasing some machinery or equipment. Because leasing is a substitute for debt and lessors are primarily manufacturers of equipment or dealers, leasing probably means greater competition among farm lenders for farm loan business. Leasing is provided for many of the same reasons that trade credit is provided. Also, leasing may offer farmers financial advantages.

The continued availability of leasing and trade credit means there will be more competition and probably losses in nonreal estate debt market share for traditional lenders such as banks and the FCS. But, this competition will likely be confined mostly to machinery and equipment. If these lenders are to compete with providers of trade credit, they will need to find lower cost procedures for delivering smaller loans.

Summary

Over the short term, the demand for agricultural credit will be influenced by incomes and the need to replace capital stock. It is expected that farm debt will increase by 3-5% in 1997.
Since 1994, farm debt has been increasing faster than the rate of inflation. Recent growth in tractor sales suggest that much of the growth in debt can be attributed borrowing to replace ageing capital stock. Generally, favorable conditions in the farm economy over the past several years have contributed to a strengthened financial condition of farm lenders. In 1996, some lenders were adversely affected by the weather related factors and low profit margins--particularly in livestock production in the Plains and Southwest. Lenders and farmers affected by these events will continue to feel stress, though overall conditions have improved. Recent surveys of bankers by the Kansas City Federal Reserve Bank indicated that repayment rates have increased while

requests for renewals and extensions have fallen.

Farm land values have been increasing in real terms for five consecutive years. Some regions have shown fairly substantial increases. But, this does not create an immediate concern for farm credit markets. Only a small portion of farm land changes hands each year and, further, much is purchased by nonfarmers. Compared to the early 1990s when 90 percent of the purchases utilized debt, today many land purchases are financed with cash. By decreasing the loan-value ratios of loans currently in the portfolio, higher real estate values are currently benefiting lenders.

Over the longer term, the outlook for farm credit is likely to be influenced by the structure of agriculture and financial institutions. An analysis of farm credit demand by farm size, farm wealth, and operator age indicates farm credit markets are already segmented. While most lenders supply some credit to all types of farms, there were market niches where some lenders were more prominent. Banks, for example, were evident among part-time, and younger farmers while FCS was more prominent among larger commercial farms and older operators. Evolving structural trends may increase the diversity of farms and lenders, contributing to further segmentation of the demand for credit.

Without legal changes which broaden FCSs lending authority, small farms are likely to remain the domain of commercial banks. The number of small farms are likely to decline over the next 10-20 years, especially with the exit of 350,000 retired farmers. But, a large segment of the population will continue to desire a "rural lifestyle". Many of these individuals will have the capability to purchase the farm assets of retired small farmers. As currently, many small farmers will continue to have strong nonfarm income. Thus, there will likely remain a large number of viable small farms. A major component of this groups credit demand will probably continue to be mortgage credit to finance a rural home and acreage. This could be an especially important market in faster growing regions adjacent to metropolitan areas or in retirement areas.

As rural regions develop and farming becomes less important to the regional economy, FCS may become a more important source of credit. FCS is likely to continue to be a dominant source of credit in the Northeast and Mid-Atlantic states. They may become more important in other regions, especially in counties adjacent to metropolitan areas which are undergoing rapid growth. As a result of their financial strength, FCS is currently well positioned to compete with banks for farmers's credit needs. But, they face continued pressure service a broader clientele, especially young and beginning farmers.

Individuals, as lenders, are likely to continue to be a source of credit to young farmers. Unless credit becomes tight, their market shares should not increase. But, because of recent legislation requiring FSA to target beginning farmers, individuals may lose market share to FSA. The use of trade credit to finance nonreal estate assets tends to be more common among younger farmers, farms displaying greater financial stress, and in regions characterized by recent land value instability. Trade credit and leasing will likely remain an important source of credit but will be confined mostly to the financing of machinery and equipment purchases.

Segmentation could be accentuated by further consolidation of lenders. For example, small banks

could target small to medium size farm loans of less than $100,000 in limited geographic areas. Large banks, on the other hand, could focus on agribusiness credits which could average in the millions. A high degree of market segmentation could create additional concern about the level of competition in individual markets. Obviously, some markets are more competitive than others. For example, grain farmers in Illinois are likely to have a more competitive market for their loans than a producer of peaches and blueberries in New Jersey. But, most groups of borrowers in the US are served by more than one lender. In many cases these are nontraditional lenders, such as individuals, trade credit, and lessors. For example, individuals and others supply over a fourth of all nonreal estate credit in New England, where commercial banks are less active in farm lending. However, it is not known if trade credit or individual financing is more or less efficient than credit provided by financial institutions.

Finally, we must recognize two important characteristics of farm credit markets. First, agricultural credit markets are a subset of rural financial markets which, in turn, are a subset of national financial markets. At one time, rural financial markets and agricultural credit markets were synonymous. Today, agriculture is much less of an economic force in rural communities. Fewer than one-fourth of rural counties depend on farming as a primary source of income. Further, these counties are home to only a fourth of the rural population. Consequently, agricultural credit markets may be heavily influenced by activities outside of agriculture. Also, it is important to realize that credit represents just one source of capital to farmers. Farmers can also obtain capital for farming by using their own capital or by attracting capital from investors. Thus, the supply and demand of debt capital will be greatly influenced by the cost and availability of leased capital and the opportunity cost of using equity.

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FARM FINANCES AND FINANCIAL MANAGEMENT: OUTLOOK IN A CHANGING ENVIRONMENT

Janet Perry, Jim Johnson, Mitch Morehart, Jim Ryan, and Bob Hoppe

This time last year, when we reviewed the farm finance situation and outlook, we presented a status-quo scenario. While we expected continued movement toward more market orientation, some believed that commodity programs would still be in place in some form. The effects of NAFTA and GATT were just beginning to be felt. The Internet was just starting to boom. Today, we recognize that people in the agricultural sector face an increased risk of business failure, and increased opportunity for success.

Changing agricultural environment brings important challenges

Farmers, input suppliers, processors, distributors, and consumers are influenced by, and respond to, markets and expectations about the future. Some decisions require long-range planning. As farmers adapt, changes will be made in their production, marketing, and financial arrangements. Continuing research on appropriate responses under different environments could improve the adaptive capability of agriculture. The willingness and ability to take on risk is not just an attitude of the farmer. Farm structure and the operating environment are important dimensions in the decision-making process. Farmers face challenges on many fronts--

- Expanding markets through international trade
- New farm legislation
- Continuing technological changes
- Continuing structural adjustments
- Heightened expectations for environmental protection

Farm management is risk management. Historically, USDA has provided publicly funded research and information activities for farmers. Information is the key link in the farmer's ability to develop plans to evaluate and cope with risk. Responses include:

- Assessing the competitiveness of U. S. agricultural production.
- Monitoring of the interaction among farm production decision makers, their goals, and their use of adaptive management strategies.
- Positioning USDA to provide products that enhance the understanding of structure and the financial performance of U. S. farms and the farm sector and the linkages between farming and other sectors of the economy.

Farm income may be lower

Lower net farm income is forecast for 1997. Lower crop cash receipts are expected to contribute to the $40 billion forecast, which is down from the record $52 billion expected for 1996 and the 1990-95 average of $43 billion. Higher receipts for cattle due to declining herd size will be largely offset by declining dairy receipts. Expenses are expected to increase, but by a smaller percentage than in recent years as declining grain prices lead to lower feed expenses.

As profit margins get squeezed, a premium will be placed on what have traditionally been considered secondary elements of farm management:

(1) **finance,** which includes decisions about what assets are needed, and how will they be acquired, and

(2) **marketing,** which involves decision on when, how and where to sell results of production.

Many farmers will need additional skills to better deal with variation in income that will come with increased reliance on the market.

Commercial farm operations procure capital assets in a variety of ways. Typically, farmers purchase products through some type of debt financing. Many farms can use internal funding from earnings derived from farm and nonfarm income sources, sometimes from multiple owners. For some additional resources come through contractual arrangements, while others gain temporary use of needed assets by renting land and leasing equipment. When farmers bring lenders, landlords, contractors, partners, and off-farm employers into the picture, the coordination of farm decision-making and control becomes more complicated, and may require a new set of managerial skills.

Where are the profits, the losses?

Net cash income is forecast to decrease in 1997 on most farms that specialize in crops. The decline will be largely due to lower receipts rather than higher expenses. Incomes of farms that are heavily dependent on corn or wheat as a source of income will be most affected by lower market prices. Highly specialized wheat farms tend to be in the Plains regions, and in parts of Montana, Washington and Idaho. Cotton and tobacco receipts are also forecast to be lower.

The decrease in net cash income is spread across farms of all sizes, with the largest declines forecast for farms that have annual sales less than $250,000. These farms generally depend more on wheat or corn for income than the largest farms.

Prices depressed by oversupply were the major reasons for lower cattle's receipts in the mid 1990s. Severe drought in 1995-96 caused herd liquidations beyond normal cattle cycle expectations. By the end of 1996 producers had reduced the herd by nearly two million animals, contributing to an improved price outlook for 1997. Further relief is expected from lower feed expenses. Most cattle operations weathered the market downturn because they had relatively strong overall financial position. Many operations with negative incomes had enough working capital to offset the loss, or could borrow the full amount of the shortfall against existing assets.

Cattle receipts and hog receipts are diminishing in importance to total livestock receipts. Paralleling that decline is an expansion in receipts from broilers, pointing to a long-term trend of adjustments in the livestock industry that reflect changes in consumer preferences. Dairy and egg revenues have also shown a declining share of livestock receipts over the past decade. These market changes make it imperative for farmers to re-evaluate their positions, then make production and financing decisions to follow.

What are expense items to keep an eye on?

Expenses will be about $184 billion in 1997, up less than half a percent from the 1996 forecast. As expenses continue to rise, some of the components of total expenses bear watching. Feed, petroleum products (fuel, agriculture chemicals) and labor contribute to almost half of the average farm's expenses. Feed expenses are expected to be lower, due to increased supply, but poor yields can change prices quickly. Price of petroleum products is determined outside the farm sector and is a function of U.S. oil stocks and the world market. This winter's stocks have been low, and supply is not expected to increase. Coupled with an increase in acreage, higher prices for fuels and agricultural chemicals may be the result. Labor markets continue to be tight and those farms depending heavily on labor (fruits and vegetables especially) may face rising expenses.

Another area of concern for the sector is rising rental rates. Land rental rates will increase as land prices go up. Forty percent of the acres used in farm production are rented and large farms have a larger share of rented versus owned land. Additional uncertainty is created by a restructuring of the landowner--land operator relationship. If land values are expected to increase rapidly, landowners are reluctant to offer long-term leases. Farmers may find themselves bidding for land that they have traditionally rented without competition.

Inflation, while lower than historical rates, is expected to pick up slightly in 1997. Continued tight labor markets slightly accelerate wage increases. Additional mild upward inflationary pressure is expected from a weakening of the dollar and stronger overall growth in developed countries that reduces excess manufacturing capacity abroad. Increases in farm income have lagged behind inflation over the past decade, and any future increases are expected to continue to lag behind the rate of inflation.

If farmers' profit margins decline, financial management should receive more attention. Input price fluctuation can be effectively managed through contracts with input suppliers. Other expenses may be managed by hiring consultants, contract labor, and custom feeding, planting, and harvesting.

Assets and Debt

Farm assets are expected to top $1 trillion in 1997. The value of farm real estate is expected to grow 6 percent in 1997. Farm business debt is anticipated to approach $160 billion by the end of 1997, its highest level since 1985 and the fifth consecutive year of rising farm debt. Rising farm sector assets and equity values and lower farm income suggests slightly lower rates of return on farm assets and equity.

The expansion in outstanding loan balances in 1997 follows a projected debt increase of almost $5 billion in 1996. Annual changes during 1994 through 1996 reflect the largest annual percentage increases in outstanding loan balances since 1982. The recent rise in loan balances can be at least partially attributed to farmers' positive view of the future of the sector, and relatively low interest rates. Non-real estate debt is expanding and farmers appear willing to borrow to replace capital

stock. Lower incomes available to service debt, coupled with lenders' emphasis on loan approval based on repayment ability rather than collateral values, will probably restrain any major increase in farmers' borrowing activities.

U.S. farm real estate values are expected to rise for the 10th consecutive year in 1996. Even in real terms, land prices will increase about 5 percent and 1997 is expected to be the 6th year of real increases. Upward pressure on land values is likely related to relatively strong crop prices, continued urban land pressures, and provisions of the new Farm Act that eliminated most acreage planting restrictions. Key factors prompting continued strong demand for farm real estate are: long term expectations for robust although variable farm income, an upbeat long-term outlook for exports, and stable interest rates.

Rising land values reflect farmers' longer term expectations of profitability in the sector. However, if farmers use their available credit lines more fully in 1997, they expose themselves to additional financial risk. Rented land accounts for about 40 percent of the value of all assets used in farm operations, and large farms have a larger share of rented versus owned land. Sometimes the market changes quickly and large capital items are difficult to acquire or dispose of quickly. Renting rather than buying land is a risk management strategy that allows farmers more flexibility in response to market conditions. It allows the owner to maintain possession and receive a return for idle assets.

While recent increases in farm business debt have not been burdensome, concentration of debt owed by tenant and beginning farmers may be growing. Most rented land has belonged to the same owner for many years and the land is fully paid for. Nonoperator landlords, often retired farmers and their heirs, owe less than 10 percent of all farm business debt. Maintaining ownership allows the retired farmer to create a more valuable estate while receiving a return on his or her investment. Ultimately, this rented land may be sold to other farm operators, current tenants, neighboring farmers wanting to expand their operations, or beginning farmers. As farmers borrow money to finance land purchases, we would expect a gradual shift of debt from nonoperator landlords to farm operators.

Although some operators may have trouble generating sufficient farm income to meet their debt service requirements, there are no signs of widespread financial stress. Farmers are comfortable making production decisions, but typically are less pro-active in the marketing of their products and financing of the business. Thus, it becomes important that farmers make effective decisions about the planning, organization, and financial control of their operations to generate the cash needed to pay any extra debt obligations.

Expanding markets

Markets for agricultural products are expanding across national borders. Trade is expected to reach a record $60 billion to $80 billion by 2005. In 1996, exports of beef were expected to increase 17%, with additional purchases from Japan, Korea, Canada, Mexico. One-quarter of the U.S. corn crop is exported; on-third of the soybean crop and one-half of the wheat crop. Corn exports reached 2.2 million bushels (3rd highest year), and wheat reached 32.5 million tons, a

33% increase. NAFTA and GATT, plus 20 other recently negotiated international agreements are opening new markets. To compete for these new customers, skills in marketing, currency exchange, and perhaps even knowledge of language and international law will be required. A change in the climate or yield in one country can have impacts on U.S. exports markets, expanding or contracting competition. And, the political nature of trade agreements and the reliance on international markets introduce new risks for the farmer.

FAIR Act brings increased market orientation, greater market risk

The Federal Agriculture Improvement and Reform Act severed the link between income support payments and farm prices by providing annual fixed, but declining payments for the next 7 years to participating farmers. Payments are based on historical production and yields, but are not linked to current production, prices, or factor use. Marketing loans are still in effect, but they do not protect against crop loss, and are set low enough that the loan has limited price protection value. Since loan rates are capped, the low safety net could be further eroded by inflation.

Constraints on individual farm decision-making imposed by previous legislation are greatly reduced, giving farmers greater flexibility to make changes in their business plans. However, farmers cannot adjust supply in response to price as quickly as other sectors. If farmers respond to high prices at harvest by planting more the next year, excess supply and lower prices may be the result. If supplies are tight and feed prices high, the only option for supply control is early release of CRP lands, which are commonly marginal lands. These lands would not add much to production, and certainly not quickly enough for financially vulnerable livestock operators to benefit from lower prices.

The Act focuses on market development and expansion through export enhancement, and on pilot projects to help farmers adjust to the new market environment. The Act establishes a commission to conduct a comprehensive review of changes to production agriculture and the appropriate role of the Federal government in it. One role USDA has chosen is to underwrite crop insurance. While purchase of crop insurance is no longer required to be eligible for farm program benefits, producers must waive all emergency crop loss assistance. Several pilot programs for revenue assurance have begun. These programs would indemnify the producer if gross income is less than a predetermined amount and is available for certain producers who elect to receive insurance against loss of revenue. The Secretary has recently approved expansion of Crop Revenue Coverage (CRC) for corn and soybeans, new CRC programs for cotton, grain sorghum and spring wheat, and expansion of Income Protection (IP) for grain sorghum and soybeans. Both insurance plans are designed as alternatives for a standard multiple peril crop insurance policy.

Risk management becomes more important

As farm income becomes more variable, risk management becomes more important. The income any one farmer earns may become more variable as agriculture becomes more markets oriented. As supply or prices of products change, new technology is adopted, or environmental constraints appear, farmers could experience higher income, or cash flow difficulties, changing expenses, and

more debt. While aggregate income for the sector, or the average net income per farm, could remain stable, variability in income for individual farmers could increase, The probability of extremes in receipts, both high and low, require farmers to plan more carefully their finances, and production and marketing of goods.

Basic Strategies Farmers Can Use

Approximately 1/3 of all farmers, but more likely commercial farmers, used government commodity programs as a risk management tool in 1995. The 6 percent of farms that had sales over $250,000 received 28 percent of payments and produced 46 percent of program commodity sales. These farmers are the most directly affected by changes in the law, but the whole sector must adjust. Payments are set by law. Farmers can choose to receive the first half of each fiscal year payment in either December or January, implying attention to tax strategies and cash flow management.

Payments are independent of price. However, farmers will no longer have the countervailing protection of supply control and will be exposed to market prices. Other than the decision of how much to plant, marketing strategies such as spreading sales over the year, use of futures, hedging, forward-contracting, or options contracts can help farmers enhance their receipts. Even smaller farms can use marketing strategies. One such strategy is direct sales— at roadside stands, farmers' markets, through mail-order, or by subscription. Elevators can combine the production of several smaller farms into a contract, and livestock producers can contract feed in relatively small quantities. Just by timing the sale of products to take advantage of higher late-cycle prices instead of selling all at harvest can substantially add to the farmer's bottom line.

Technological advances--don't underestimate their effect

Technological advances, especially biological and computer technology, continue to affect farming. These new technologies may revolutionize agriculture much like tractors did in mid-century. Just as farmers replaced horses and people with power equipment, so, farmers will need to use other technologies to their benefit. Producers that apply these new technologies to create products and services to meet society's changing needs and preferences will capture a larger share of the market. The market is driven by consumers and the successful farmer will tailor farm products to meet consumers' demand, and will provide those products to the next step in the production process in a timely manner.

Farmers' willingness to take a risk, and risk-bearing ability given their equity and cash flow positions, affect the structure and organization of their farms. Farmers' attitudes also affect strategies that they may employ to reduce or manage risk. Some farmers are willing and able to take high risks; others may wish to reduce risk. Adoption of new technology is risky. At first, an innovation is conceived and only a few will even examine its possibilities. Then gradually, the early adopters--those will to try new things although no one else does--will begin to use or apply the concept. As these early adopters show positive results, ever more people will apply the concept. Finally, those that wait to try new things until they are proven by others will adopt the practice or be left behind.

From survey results, we find evidence of each stage of adoption. 38 percent of farmers said they used the same technology as other farmers in their county. 21 percent said that they tried new technologies although only a few other farmers used them, and 3 percent said that they were usually the first to try new technologies. Early adopters were more likely to have larger farms (almost 10 percent of farmers with gross sales more than $250,000 were in this category) and to generate higher returns. Even more telling, 1/4 of operators with small farms--sales less than $50,000--said that they had no particular strategy of technology-use at all!

How do farmers use technology to improve their returns? Farmers can take advantage of a variety of technologies to better target and market to customers who buy agricultural products. New processing and packaging bring the opportunity to provide products to consumers in a variety of forms. Applications of biotechnology can produce products with specific characteristics, such as tomatoes that are ripe and juicy, but still package and travel well. Computer technology allows the processing of vast amounts of data so that farmers can track production expenses, identify emerging markets, and plan a shift in their efforts toward those new consumer preferences. To meet these challenges, farmers may need to change their procurement strategies, production and processing methods, or marketing approaches. These changes will alter the structure of farms and of rural communities.

Changes are already occurring. One change is the introduction of the Internet to agriculture. For example, just searching the Internet for the word "agriculture" brought up an index of 113 entries about pest control, 80 on machinery, 156 on livestock and 62 organizations. ERS has a homepage that allows electronic access to hundreds of publications, tables, and briefings. The Farm Business Economics Briefing Room has documents on farm income, farm costs and returns, farm structure, farm households, and current farm financial performance.

Structure of agriculture affects distribution of farm income

The number of farms has declined for decades, and we have no reason to expect this trend to reverse. In fact, because almost a quarter of farm operators were at least 65 years old and another 22 percent between 55 and 64 years old in 1992, many farms will soon change ownership. To some extent, adjustments have already occurred. Most of these elderly operators have already scaled back their operations, and the 17 percent of all U.S. farms had operators who reported that they were retired, but continued to farm. These farms accounted for only 2 percent of agricultural production in 1993.

Despite declining numbers of farms, data from the census of agriculture show that family-owned farms (individual operations, partnerships, and family corporations) are not losing their share of U.S. agriculture to non-family corporations. Family corporations, however, increased their share of both farms and sales during the 1978-92 period.

Changing structure encourages new ownership, operating and financing arrangements, and the flow of assets to the production process. For example, growth of contracting arrangements could change rates of entry or exits and the need for capital by the farmer. Another change in

operations is the hiring of professional managers and consultants. The dynamic nature of farm businesses often requires special talents for a short time. These services augment the farmer's production, marketing, and financial arrangements. Farmers can purchase services such as advice and consultation on conservation practices, regulatory compliance, investment analysis, bookkeeping for business planning, and marketing services, as well as production practices such as tillage, pesticide use, animal waste disposal, and harvesting. When farmers decide to purchase services rather than do those jobs themselves, they can shift their attention to other aspects to the business.

Commercial farms today may require resources than can be provided by a single household. According to the traditional view of farming, each farm is associated with a single operator household that receives all the farm's net income. By 1993, however, 26 percent of farms had multiple suppliers of assets and receivers of net income. Single-household farms are still the norm. These farms are closely held (legally controlled) by a single household, and the household shares net income from the farm with no other household. However, more and more, farms also have share landlords or production contractors with which it shares output. And, as farms get larger, production by family farms has been shifting from proprietorships to arrangements that include other family members, allowing farm families to pool resources.

Farmers are using contracts to manage risk

Some important structural changes have occurred in the way farm production and marketing are conducted. Industrialization has led to farms specializing in a particular commodity or stage of production. In the production process, decision-making is divided and people tend to specialize in ownership of assets, management, and farm work. For example, in a vertically integrated operation, the same firm typically owns several farm-related businesses, such as hatcheries, feed mills, processing plants, and packing facilities. An integrator may also own farms or, more typically, contract with farmers to produce commodities.

Another aspect of industrialization is the increase in reliance on production and marketing contracts as farmers have become less dependent on terminal markets and spot pricing to market their goods. Most farms (89 percent) had only cash sales in 1993. But contracting or vertical integration had become dominant modes of production and marketing in the broiler, turkey, egg, milk, and specialty crop markets, and is becoming increasingly common in hog farming. The remaining 11 percent of U.S. farms had at least one marketing or production contract, but these farms accounted for about 40 percent of production, as measured by gross sales.

The increasing use of contracting is commonly identified with the industrialization of agriculture. In part, industrialization arose as consumers began to buy food products rather than food commodities. Processors need a steady supply of farm products of known quality and specifications to process. Contracting and vertical integration help provide these farm products, and so reduce processor risk.

Contracting can also reduce marketing and production risks for producers. Because marketing contracts set a price in advance for output, they reduce marketing risk. Since production

contractors own the commodity produced, make most of the production decisions, and supply most inputs, they assume a substantial part of the risk associated with production and marketing of the product. The actual distribution of risk, of course, depends on the terms and conditions of the contract and the bargaining strength of the farmer and the contractor. In exchange for reduction in risk, the decision of what to produce (contract for) and at what price is moved away from farmers into the realm of the contractor or processor. Many contracts specify the production practices and supply the inputs, but farmers still have room to exercise their management skills. Contractors expect production management and reward good managers with bonuses. Farmers will still make financial decisions, and build equity in the business.

Environmental impacts becoming more important

Agriculture in the 21st century will be constrained by environmental concerns--

- *in local law* that zone the location of animal confinement yards,
- *in federal laws* that govern use of chemicals and soil erosion, and
- *in international laws* that regulate greenhouse gas emissions or sanitary and phytosanitary conditions.

Rather than defend themselves against charges of degradation of the environment, and risking fines and/or legislation requiring environmentally friendly practices, some farmers are choosing to adopt sustainable farming practices.

Many of these practices-- erosion control, animal waste treatment, or setting aside land for wildlife or wetlands--could result in additional costs for which the 1996 legislation has provisions for some cost-sharing. The interest in natural resource conservation brings opportunities for farmers to tighten the link between their products and the consumer, but also costs for implementation and/or legislative fines. Besides several smaller programs the following programs are authorized:

- Conservation Reserve Program continues
- The Environmental Quality Incentives Program (EQIP)
- Wetlands Reserve Program

CRP continues under the FAIR Act, with enrollment up to 36.4 million acres. Early-outs are permitted for land enrolled for at least 5 years and is less environmentally sensitive. New enrollment of environmentally sensitive land is permitted to replace the early-outs and contracts that expire. Three priority areas were established for CRP--Great Lakes region, Long Island Sound Region, and the Chesapeake Bay Region. The program includes $50 million for 1996-2002 to be funded for cost-sharing of the Wildlife Habitat Incentives Program.

EQIP is authorized at $1.3 billion over 7 years to provide technical, educational, and cost-share assistance and incentive payments to producers in carrying out structural and management practices to protect soil and water resources. At least half the fund is allocated to environmental concerns associated with livestock practices. All but the largest operations are eligible for cost-sharing. They are eligible for technical assistance, educational assistance, and incentive

payments for animal waste facilities, plus cost sharing for other approved practices.

The Wetlands Reserve Program allows farmers to restore up to 975,000 acres of wetlands and enroll those acres into paid easements. In addition, restoration of the Everglades is funded up to $200 million from the Treasury. An additional $100 million is authorized through the sale or swap of other federally owned land in Florida. Purchase of private land by the Fed in the Everglades Agricultural Area is permitted.

Farming activity will be governed by other laws like the Comprehensive Environmental Response, Compensation and Liability Act, (CERCL) amended in 1996. This law requires that farms meet certain EPA standards for point-source pollution. International trade accords contain environmental agreements. One that will affect agriculture is the Montreal Protocol on Substances that Deplete the Ozone, which restricts the import and export of chemicals such as methyl bromide--a broad-spectrum pesticide. It will be up to farmers to publicize their efforts. Farmers will pay the costs of carrying out environmentally friendly practices, or pay the costs of fines, strict legislation, and adverse publicity

Implications in a Changing Environment

Tried and true management strategies to respond to tighter margins such as controlling costs or increasing efficiency and productivity are still important. However, the current environment demands more. Successfully management requires planning and control of the marketing and financial aspects of the business as well. In the short term farmers will find that:

- Increased globalization of agricultural trade will open new markets for farmers, but also increase competition.
- Increased reliance on market transactions will signal farmers what to produce, how to produce and at what price they can afford to produce. It will also expose farmers to the risk of extremes in income.
- Technology will expand opportunities to target markets, but increased expense and entrepreneurial skill will be needed to implement it.
- Pressure on commercial farms to manage resources through innovative organization, production, and marketing arrangements will continue.
- Agriculture will be under pressure to respond to enhanced awareness of environmental impacts of agriculture.

Increased emphasis on returns to management rather than returns to capital assets will generate the needed higher returns. Successful managers will combine financial and marketing skills with the production management skills that have dominated in the past.